DOCUMENT RESUME

ED 164 700 UD 018 975

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TITLE The Consequences of Age at First Childbirth: Female Headed Families and Welfare Recipiency. Working Paper: 1146-05.
INSTITUTION Urban Inst., Washington, D.C.
SPONS AGENCY National Home Study Council, Washington, D.C. Accrediting Commission.
PUB DATE Aug 78
CONTRACT N01-HD-62829
NOTE 87p.; For related documents, see ED 149 002, UD 018 971-977; Not available in hard copy due to reproduction quality of the original document
AVAILABLE FROM The Urban Institute, Program of Research on Women and Family Policy, 2100 M Street, N.W., Washington, D.C. 20037

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Age; *Birth; Educational Experience; Employment Experience; *Females; *Heads of Households; Longitudinal Studies; *Mothers; One Parent Family; Racial Factors; Regional Characteristics; Socioeconomic Influences; *Welfare Recipients
IDENTIFIERS Michigan Panel Study of Income Dynamics; National Longitudinal Survey of Young Women

ABSTRACT

The basic hypothesis explored in this report is that a young age at birth of a first child is directly associated with becoming a female family head and/or welfare recipient. To determine the validity of this hypothesis, the effect of premarital birth, a young age at first marriage, educational attainment, and family size are explored. Data from two surveys, the National Longitudinal Survey of Young Women and the Michigan Panel Study of Income Dynamics, are used in the exploration of these variables. Findings presented indicate that early childbearing is not directly related to subsequent welfare dependency. However, it is argued that teenage birth can increase the probability of welfare receipt indirectly in a number of ways. Some of the reasons given include such factors as larger family size, disrupted schooling, lowered learning ability, and lack of support programs. Other relevant variables are race and regional characteristics. (EB)

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WORKING PAPER: 1146-05 August, 1978

THE CONSEQUENCES OF AGE AT FIRST CHILDBIRTH: FEMALE HEADED FAMILIES AND WELFARE RECIPIENCY

by

Kristin A. Moore and Sandra L. Hofferth

UD018975

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ACKNOWLEDGEMENTS

This project was funded by the Center for Population Research, National Institutes of Health, under contract number NO1-HD-62829. The contents of this publication do not necessarily reflect the views or policies of the Department of Health, Education and Welfare.

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The excellent computer assistance provided by programmer Gwen Stanley of Group Operations, Inc., is gratefully acknowledged. The technical support provided by staff members Copper Wilson, Bobbie Mathis, Cathy Cataldo, Bonnie Trumbule, John Fortunato-Schwandt, Barbara Kratchman, Nancy Bertaux, Laura von Behren, Director of Research on Women and Families, Nancy Barrett, and former Director Isabel Sawhill made production of this report possible; the assistance of each is much appreciated.

TABLE OF CONTENTS

INTRODUCTION	1
LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT	4
The Determinants of Becoming a Female Head	4
The Determinants of Welfare Dependency	7
DATA	10
The National Longitudinal Survey of Young Women	10
The Michigan Panel Study of Income Dynamics	11
ANALYTIC STRATEGIES	14
VARIABLES	16
Measurement of Age at First Birth	16
The National Longitudinal Survey of Young Women	16
Panel Study of Income Dynamics	17
Comparison of Age at First Birth Distributions with Current Population Reports	17
Other Variables	19
RESULTS: FEMALE HEADED FAMILIES	20
The Simple Association Between Age at First Birth and Being a Female Family Head	20
Multivariate Analysis: National Longitudinal Survey-Female Headed Families	25
Multivariate Analysis: Panel Study of Income Dynamics - Female Headed Families	28
RESULTS: WELFARE RECEIPT	33
The Simple Association Between Age at First Birth and Welfare Dependency	33
Multivariate Analysis: National Longitudinal Survey - Welfare	42
Multivariate Analysis: Panel Study of Income Dynamics - Welfare	46
Transition Probabilities: Public Assistance Entry and Exit	55
SUMMARY AND CONCLUSIONS	61
Female Headed Families	61
Welfare Recipiency	62
Transition Probabilities	64
APPENDIX TABLES	65
METHODOLOGICAL APPENDIX	75
REFERENCES	79

CONSEQUENCES OF AGE AT FIRST CHILDBIRTH:

FEMALE-HEADED FAMILIES AND WELFARE RECIPIENCY

INTRODUCTION

During the last several decades, the proportion of all families that are female-headed has grown nearly ten times as rapidly as the proportion that are two-parent families; one in seven children lived in female-headed households in the mid-1970's (Ross and Sawhill, 1975). Nearly 9 percent of the white population and 32 percent of the black population lived in female-headed families in 1976 (Farley, 1978, Table 2). Some of these families originate because of the death of the husband; however, most are formed by the divorce of the parents and the assumption of the children by the mother, or secondarily, by the birth of an out-of-wedlock child. Because adolescent out-of-wedlock mothers frequently become female-household heads unless or until they form a two-parent household and because early marriages are often precipitated by pregnancy, only to later terminate in divorce, it seems likely that early childbearing contributes to the formation of female-headed households.

Concerns about the female-headed family are numerous but not universal. Brown, et al. (1976) detail the many satisfactions experienced by women after terminating unhappy marriages, despite the expense and difficulty of rearing children on their own. However, economic support is a clear problem for this family type. As Table 1 indicates, income is considerably lower among families headed by women. According to other calculations, 48 percent of the families in poverty are female-headed families (U.S. Bureau of the Census, 1978).

Table 1: Mean Family Income, 1974, of Families With One or More Own Children Under Age 18

Age of Head	Husband-Wife Families	Single-Parent Families: Male Headed	Single-Parent Families: Female Headed
Under 25	$ 9,168	$ -	$ 3,600
25-44	15,941	12,093	6,481
45-64	17,517	13,045	8,438

Source: "Money Income in 1974 of Families and Persons in the U.S.," Current Population Reports, Series P-60, No. 101, Table 29, pp. 59-60. Washington, D.C., U.S. Bureau of the Census, 1976.

Women's earnings average only about 60 percent of men's earnings (U.S. Bureau of the Census, 1978), making it difficult for most women to support a family as adequately as a man might. Moreover, few female-headed households receive regular, sustained, or substantial child support payments from absent fathers (Sawhill, et al., 1975). Consequently, most women experience a substantial drop in income after divorce if they do not remarry (Heclo, et al., 1973; Hoffman, 1977).

If an early birth increases the probability that a woman will become a female head, it therefore also increases the likelihood that she will experience economic need. In addition, to the extent that an early birth truncates the woman's formal schooling, the earning opportunities of a teenage mother are limited and poverty is more likely. Moreover, the larger families borne by women who begin family building during their teenage years tend to limit labor force participation. And, of course, whatever the income, the more people sharing that income the lower per capita income is. Consequently, women who bear their first child at an early age seem likely to later experience poverty

and to require public welfare assistance. Indeed, female household heads frequently become dependent on welfare after an early birth (Presser, 1975) as well as after divorce (Hoffman, 1977). With the cost of the AFDC (Aid to Families with Dependent Children) program approaching $10 billion in 1976 (U.S. Bureau of the Census, 1977), the economic liabilities of this family type and the effect of early childbearing on welfare dependency are important to government as well as to the family members who must survive on a low income.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The current study provides an opportunity to explore the link between fertility, welfare dependency and family structure, this time in a model that includes the previously-ignored variable of mother's age at the birth of her first child. A young age at first birth seems likely to increase the probability that a young woman will become, for some time, a female household head and will require welfare assistance. Since few researchers have focussed on these particular issues, much of our discussion must rely on extrapolation from related work as well as common sense predictions as to factors that might affect the probability that a woman will be a female family head or a welfare recipient.

We hypothesize, simply, that (1) the earlier a woman bears her first child, the greater the probability she has of heading a household alone, net of relevant control variables, and (2) the earlier a woman bears her first child, the greater the likelihood that she will require welfare assistance, net of relevant control variables. However, even if direct effects from age at first birth to an outcome variable are not noted, the possibility of an association is not ruled out. Indirect effects that are mediated by educational attainment and family size certainly provide plausible routes by which age at first birth might affect family structure and welfare dependency. In particular, the lower education (Moore, et al., 1978a) and larger family sizes (Moore and Hofferth, 1978b) of teenage mothers suggest reasons why teenage mothers might be over-represented among welfare recipients (Moore, 1978c).

The Determinants of Becoming a Female Family Head

The concern of the U.S. government regarding the growth and composition of female-headed households is reflected in publication of a recent report by the Bureau of the Census entitled, "Female Family Heads" (1974). While

refraining from a statement of causation, the Bureau notes that the increased incidence of female-headed families might be due to the increased frequency of divorce, to the number of unmarried mothers who bear and keep their children, to adoption by unmarried adults, to the increased ability of women to maintain separate households due to "the availability of better and wider choices of jobs" and possibly to the "increased availability of public assistance programs" (Ibid., p. 1). Their discussion suggests that factors associated with the occurrence of both marital disruption and out-of-wedlock childbearing should be controlled for in evaluating the impact of age at first birth on female-headed families. In addition, the employment opportunities open to women as well as the attractiveness of public welfare might affect the probability that a woman becomes a female family head, since these factors affect her ability to support a family without a husband. Given the increased frequency of the female-headed family form in recent years, birth cohort also seems to be an important factor to consider in an analysis of this topic.

Variables anticipated to affect the probability of divorce and separation will also be included here as control variables, for example, respondent's race, whether the first birth was premarital, prescence of a young child, Pacific Coast residence, metropolitan residence, respondent's age (as a measure of birth cohort), labor market opportunities and age at first marriage.

Critical variables noted in the Moore and Caldwell (1976) analysis of out-of-wedlock childbearing include, again, respondent's race and birth cohort, intact family background, and social status of family of origin. Measures of religion and religiosity unfortunately are not available in the National Longitudinal Survey (NLS) data, but they are included in the Panel Study of Income Dynamics (PSID) analyses.

The PSID data includes a measure of the respondent's physical health. This variable will also be included on the hypothesis that women with physical limitations are less attractive candidates for marriage or remarriage.

The respondent's educational attainment represents not only the negative relationship between years of schooling and the probability of divorce but also the positive association between years of schooling, job opportunities, and marital disruption. These two effects may cancel one another. A proxy for employment opportunities included in the NLS analysis is local unemployment rate. Like education, this variable could have several effects in that male unemployment could trigger separation (Sawhill, et al., 1975) or female unemployment could force women to be dependent on male support. Again, these two effects could cancel one another out, however, no sex-specific unemployment measure is available. Several more specific variables are available in the PSID data, for example, the relative wages of men versus women and the job markets for women and blacks.

A number of researchers have studied the hypothesized role of welfare availability in encouraging out-of-wedlock childbearing (Moore and Caldwell, 1976; Bernstein and Meezan, 1975; Cutright, 1970; Presser, 1975; Winegarden, 1975; Cain, 1972); however, little evidence that welfare encourages childbearing outside of marriage has accumulated. As Presser concludes, "in general, public assistance may be a consequence of an untimely birth rather than a stimulus for that birth" (Presser, 1975: 227).

Other work has explored whether welfare encourages marital breakup among low-income couples in which the woman might, separated from her spouse, qualify for benefits (Hannan, et al., 1977: Sawhill, et al., 1975; Moles, 1976; Bernstein and Meezan, 1975; Honig, 1973; Cutright and Scanzoni, 1973). Because of the availability of welfare she may be able to obtain an economic

independence that otherwise would not have been possible. This question has not been resolved and presents an important issue for policy research. The attractiveness of welfare benefits is measured by the AFDC benefit level in the region of residence[1] in the NLS analyses. In the PSID data, the respondent's state of residence is known making it possible to calculate state level measures of the AFDC benefit level.

The Determinants of Welfare Dependency

The factor that is perhaps most often accused of encouraging welfare dependency is the level of welfare benefits. Although consistent evidence that generous benefit levels draw women onto the welfare rolls is lacking, the issue has not been resolved. The regional AFDC (Aid to Families with Dependent Children) is the only variable available for inclusion in the NLS regressions. (Inclusion of this variable also necessitates inclusion of a control for residence in the South, because the level of benefit payments is so regularly low in the South, as are costs overall, that AFDC benefit level are included.

Whether a woman goes on welfare must be a function, of course, of her alternatives to welfare. Such alternatives include not only her own possibilities for employment but also the employment of others, particularly a spouse. However, since few women married and living with their husbands qualify for or receive AFDC payments,[2] and since there is no information on the husband's characteristics for unmarried women, a measure of marital status is not included. Therefore, the employment variables that are included consist primarily of measures of the woman's own opportunities for employment.

1. Regional benefit level is used because state of residence is not revealed in order to protect respondent anonymity.

2. In 1973, in only 12 percent of families receiving AFDC was the father living in the home (U.S. Bureau of the Census, 1975: 309).

These are represented in the NLS regressions by her educational attainment, by the unemployment rate in her local labor market, and by the demand for female labor in her local labor market. In the PSID data, there is a wider range of variables that tap employment opportunities, for example, the proportion of years that a woman has worked since age 18, the relative market for males versus females, the typical male wage, the woman's potential monthly earnings, and the local unemployment rate. The existence of a physical limitation is also included, since health affects employability. Finally, family size and the presence of a child under age 6 are included, given the inhibiting effect of childbearing on employment (Sweet, 1973).

Given the general increase in the frequency of welfare dependency during recent years (U.S. Bureau of the Census, 1975: 307) a control for the respondent's birth cohort also seems essential, and because of the general over-representation of blacks among AFDC recipients (U.S. Bureau of the Census, 1975: 309), it is important to control for race in an analysis of the impact of early childbearing. Variables measuring parental socioeconomic status and whether the family of origin was intact when the respondent was age 14 also seem relevant, since welfare recipiency is felt to be perceived more as an option by lower status persons and persons from non-intact families due to prior personal or peer group experience with the welfare system. Receipt of child support or alimony is included in PSID regressions, since such economic assistance from an estranged spouse should reduce the need for welfare support. Finally, metropolitan residence and Pacific Coast residence are included in the thought that the availability and acceptability of welfare receipt might vary by residence. Little work has been done on the individual-level correlates of welfare recipiency; therefore, the addition of these controls is somewhat speculative, and there may be other controls that have been omitted.

An unfortunate but unavoidable shortcoming in the NLS analysis is caused by the wording of the interview question that produced the dependent variable. NLS respondents were asked each year, "Did anyone in this family receive any welfare or public assistance in the last 12 months?" The response categories that are provided are simply "Yes" and "No," and there is no attempt to learn who was the recipient of the assistance or the nature of the assistance. Thus, it is not known whether the young woman herself received AFDC payments or whether a parent of sibling received assistance. To reduce the lack of clarity, one analysis of welfare dependency is conducted on a sub-sample consisting solely of female-headed households with children present, since it is virtually certain that, in this limited sub-sample, if anyone received welfare or public assistance it was the respondent herself. However, since there are only 120 female household heads with children present in the NLS sample (and even fewer with no missing data), a supplementary analysis is reported that is based on all respondents who have children at age 24. A similar procedure was followed with PSID respondents, although in this case there are 400 female household heads. It is important to keep in mind for analyses including women who are not household heads, that the dependent variable in this case cannot be guaranteed to be a measure of welfare dependency on the part of the respondent, as one would wish.

DATA

Analyses were conducted on two national longitudinal data sets, the National Longitudinal Survey of Young Women (NLS) and the Panel Study of Income Dynamics (PSID). Both surveys were initially fielded in 1968 and in each case respondents were interviewed annually. While similar in their focus on economic and employment issues, the two surveys sample quite different populations. Analyses reported here rely on interviews conducted between 1968 and 1972 for the NLS and between 1968 and 1976 for the PSID. Each data set will be described in turn.

The National Longitudinal Survey of Young Women

The National Longitudinal Survey of Young Women (NLS) is funded by the U.S. Department of Labor to study the labor market experiences of contemporary young women. It is designed by the Center for Human Resource Research of Ohio State University and fielded by the U.S. Census Bureau. The initial wave in 1968 sampled over 5000 young women between the ages of 14 and 24. Attempts to reinterview these young women were made annually from 1969 through 1975. Sample retention has been very good. By 1972, the last year considered here, 4625 respondents--90 percent of the original sample--remained in the survey. Since the initial response rate was 94 percent, data on nearly 85 percent of the sample that was initially drawn are available for the current analysis. While these data are among the best available, sample attrition may have reduced the original representativeness, and some caution in generalizing to the entire population is necessary.

In order to produce statistically reliable estimates for black women, households in enumeration districts known to be predominantly black were selected at a rate three times greater than the rate for white enumeration

districts. In 1968, 3638 white women and 1459 black women were interviewed. (Sixty-two young women of other races were interviewed but have been consistently excluded from these analyses because of their diversity.) A sample weight was assigned to each individual case to correct for the fact that different groups of the population had different probabilities of selection. The weights were computed so that the sum of the weights would equal the sample size of 5159.

The NLS data are especially well-suited for a study of the consequences of early childbearing because they follow young women through the teenage and young adult years when family-building typically takes place. For a large proportion of the sample data on marriage and childbearing are not retrospective but are gathered as the events occur. Because extensive information on the educational and work experience as well as the social and economic background of respondents was obtained, detailed comparisons can be made between women who became mothers while teenagers and other young women who postponed their childbearing. Such extensive data are not frequently available for so large or contemporary a sample.

The Michigan Panel Study of Income Dynamics

The Panel Study of Income Dynamics was inaugurated in 1968 to provide information on short run changes in the economic status of families and individuals. To this end, approximately 5000 families have been interviewed annually through 1978. Data obtained through 1976 are included in the current analyses.

The original sample consisted of a cross-section sample of dwelling units within the continental United States plus a subsample of families interviewed in 1967 by the U.S. Bureau of the Census. Since 1968, the sample has consisted of all panel members living in families that were

interviewed the previous year plus newly-formed families that include any adult panel member who had moved out of the sample household since 1968. The addition of newly-formed families has resulted in an increased sample size despite sample attrition.

Panel losses were considerable (24 percent) in the first year but have been relatively minor in recent years. However, the cumulative response rate including initial and subsequent losses, is only 55 percent. The data were weighted in 1972 to adjust both for different sampling fractions and for different rates of nonresponse. Since that time, attrition has not been sufficiently great to warrant further adjustment, and the authors present evidence that estimates made from PSID data correspond closely with estimates obtained from the Current Population Reports (Survey Research Center, 1976, pp. 499-510).

The PSID was explicitly initiated to provide the best possible measures of respondents' family incomes, individual wages, and employment history. The income measures are generally considered to be superior to estimates from the Current Population Survey (Minarik, 1975), and tabular comparisons of both data sets show a high degree of congruence on the weighted distributions of most standard demographic variables (Sawhill et al., 1975). Despite the reassurance that this provides, it seems extremely important to use caution in generalizing from results to the entire United States population.

For the years 1968 to 1975, all information is related to the head of the household. Consequently, little information is available on married women, since they are not defined as heads. Fortunately, in 1976, wives were also interviewed, and detailed information on wives' labor force participation, family background, and earnings was obtained. In addition, wives supplied information on their age at marriage and age at first childbirth, data that

cannot be reliably obtained from some of the interviews held with the husband, who is defined as the head of the household.

Although initial plans called for analyses on all women who turned 24, 30, 36, and 42 during the course of the survey, it soon became clear that a far richer and more complete analysis could be done if emphasis were placed on the sub-set of wives and female heads who were interviewed in 1976. Moreover, the number of women available for analysis was not greatly diminished. Of 2630 wives and female heads aged 16 to 42 in 1968, 156 (6 percent) were not interviewed in 1976. For the 2474 wives and female heads in our sample who were interviewed, there is a wealth of information. The slight loss in sample size seems far outweighed by the additional information available on these women and their experiences.

ANALYTIC STRATEGIES

The basic hypothesis being explored is that a young age at the birth of a first child is directly associated with becoming a female family head and/or a welfare recipient. In addition, the effect of a premarital birth, a young age at first marriage, educational attainment and family size will be explored. Results will be presented in two sections. First, factors affecting the probability of being a female household head will be explored. Second, the determinants of welfare dependency will be considered.

Initially, the gross association between age at first birth and the dependent variable (being a female household head or receiving welfare) will be examined, controlling only for respondent race and socioeconomic status.

Following exploration of simple associations we then proceed to multivariate analyses so that the effects of age at first birth, premarital pregnancy, and age at first marriage, plus appropriate control variables, can be evaluated simultaneously.

An initial multivariate analysis in each section will focus on those NLS women who turn 24 during the years of the survey. Because this strategy catches all the young women at the same age, it partially controls for the enormous life cycle variation in the lives of young women who ranged in age between 14 and 24 in the first year of the survey. Looking only at women who are mothers by age 24 does, of course, omit many young women who have not yet had children. This is necessary, however, since only women with children are eligible for Aid to Families with Dependent Children. Only those women who turn 24 during the survey are studied, since only for these women is there sufficient information for a multivariate analysis. A similar set of regressions will then be reported for PSID women who have children under age 18 in 1976.

An additional analysis strategy is then employed to further examine the effect of a birth on welfare dependency. In the transition probability approach, the year by year probability of going on welfare is examined as a function of the occurrence of a birth, as well as numerous other factors. This approach focusses on the population at risk of an event, in this case, the women in the sample who are receiving welfare. These women are eligible to make the transition onto welfare during the year. If a woman who is not on welfare at the time of one interview is receiving welfare by the time of the next interview, she is given a code of "one." If she is still not receiving welfare, she is coded "zero."

VARIABLES

Measurement of Age at First Birth

Neither the NLS nor the PSID contains a childbearing history for women. Consequently it was necessary to construct such a record for all respondents. The procedure by which this was done for each data set will be described.

The National Longitudinal Survey of Young Women. To develop a measure of the young woman's age at first birth, the household record in 1968 was searched for any sons or daughters of the respondent. The age of the oldest of the respondent's children was subtracted from the respondent's age in 1968 to yield age at first birth. First births which occurred in subsequent survey years were identified by searching the household records of childless respondents. When a first birth was identified, the respondent's age at the last interview was assigned as her age at first birth. Since exact birth dates are not known for either the respondent or her children and age is coded only in full years for respondents and children over three, the measure of age at first birth contains some error. Where some uncertainty existed our decision rule erred by assigning the older age at first birth.

The measure of age at first birth used here does not include children who were given up for adoption shortly after birth, who were stillborn, who died in early childhood, or those who were sent to live outside the respondent's household.[1] Own children of the respondent cannot be distinguished from adopted children. We are, then, in effect, measuring the impact of the age at

1. Although women who reported having children at one point but not at age 18, 21, or 24, when family size measurements were made, were dropped from the NLS sample, their numbers are of interest. Twenty-nine of 1,201 women who reported a child at an earlier age no longer had that child living with them at age 24. Similarly 35 of 909 mothers had "lost" a child by age 21, and 43 of 393 had "lost" a child by age 18. We simply do not know what happened to these children.

which a young woman takes on the duties and responsibilities of motherhood, or becomes a mother in a social sense. The variable used here should be a fairly unbiased measure of sociological, if not of biological, motherhood.

Panel Study of Income Dynamics. The measure of age at first birth was determined differently for wives and for female heads. For the 1701 women in the sample who completed the survey for wives in 1976, the age of her oldest child as reported by the wife was subtracted from the wife's age. No similar information was available for female household heads; consequently the measure of age at first birth for the 773 women who were household heads in 1976 was based on the household record. If a first birth occurred during the survey years, the woman's age in the year of the birth was assigned. Otherwise, the household record for 1968 was searched for the age of the oldest child and this age was subtracted from the woman's own age. Since women in the sample in 1968 could have been as old as 42 in that year, it is possible that some of their children would have grown up and left home. This, of course, would result in an incorrect assignment of age at first birth. This would only be a problem for heads approximately 32 to 42 years of age in 1968--38 percent of the sample of female household heads or 12 percent of the total sample of women. However, the children most likely to be missed are those born to the youngest mothers, since they are most likely to have grown up and left home before their mothers turned 40. Because of this problem, an additional regression will be reported for PSID women under age 35. Analyses on these younger women should not be affected by this problem. Analyses on wives are also unaffected.

Comparison of Age at First Birth Distributions with Current Population Reports

Table 2 presents the weighted proportions of women in the NLS and PSID samples in several age-at-first-birth categories. These distributions can be compared with distributions calculated from data from the 1971 and 1975

Current Population Reports for first births that occurred after the year 1960. The distributions are strikingly similar, although both the NLS and PSID samples have a higher proportion of births among women at older ages. The highest proportion occurs among the total PSID sample, which, as noted above, is probably elevated by the loss of some early births among older family heads. The young women in the NLS and in the young women PSID sub-sample have few first births that occurred as early as 1960. Since the younger the sample, the more likely the women would have participated in the trend toward delayed childbirth (Bureau of the Census, 1978), it seems likely that some of the difference represents true societal changes over time. While the overall correspondence of the NLS and PSID data with Census Bureau data is most encouraging, it should be kept in mind that some inaccuracy due to coding and missing information was unavoidable. As always, our results should be considered within the context of the findings of other researchers, as well as that of the researcher's expectations.

Table 2: The Distribution of Women by their Age at First Birth, 1971 and 1975 Current Population Survey (First Births Occurring After 1960), National Longitudinal Survey and Panel Study of Income Dynamics

Age at First Birth	1971 CPS	1975 CPS	NLS	PSID	
			at age 24	Total	≤ 35 in 1976
≤17	.128	.129	.113	.112	.113
18	.095	.092	.095	.062	.071
19-20	.259	.248	.186	.214	.212
≥21	.518	.530	.607	.633	.605

Other Variables

Because the age of the respondent at her first birth and first marriage must be obtained from household record data, there is some unavoidable inaccuracy inherent in the construction of the variable that measures premarital pregnancy. First births that occur in the same year as first marriages are coded "ambiguous," since it is unclear whether or not conception preceded the marriage.

Other variables used in the analyses are defined in the Appendix. Means, standard deviations, and variable definitions are reported in Appendix Table 1 for NLS respondents. PSID statistics are presented in Appendix Table 2.

RESULTS: FEMALE HEADED FAMILIES

The Simple Association Between Age at First Birth And Being A Female Family Head

Tables 3 and 4 present the proportion who are female household heads among all respondents who have ever had children by 18, 21, and 24 for NLS respondents and for PSID women with children under age 18, respectively. There is some indication that NLS women having earlier births are more likely to be female household heads by age 24, but the trends are not regular or very large. No trend at all emerges among PSID women. If anything, whites who were teen mothers are less likely to be household heads. The more striking difference is that between blacks and whites, and it is probably this relatively high proportion of blacks in the early childbearing categories compared with the later categories that raises the probability of being a female household head among early chilbearers in the total columns at the top.

Table 5 presents the proportion of NLS mothers who are female family heads by the timing of the first birth relative to the first marriage. Young women having premarital (out-of-wedlock) births seem to have a considerably higher probability of being female household heads at ages 18 and 21. Since a premarital birth by definition establishes a female-headed family, it is the young woman's status at age 24 and the status of PSID mothers (shown in Table 6) that is of greater interest; and among these older women it does appear that a large number of early childbearers have established husband-wife families. However, even at age 24, nearly one-third of the NLS women having premarital first births are not currently married--one-fifth of the whites and nearly half of the blacks, proportions that are almost exactly duplicated among PSID women.

Table 3: Percent of Female Headed Households Among Respondents Ever Having Children by Ages 18, 21, and 24 by Age at First Birth, by Race and by Socioeconomic Background (National Longitudinal Survey)

Age of Respondent at First Birth	at age 18	at age 21	at age 24
ALL RACES			
≤15	63% (51)	34% (34)	30% (48)
16-17	43 (213)	25 (163)	18 (167)
18		23 (175)	16 (179)
19-20		23 (353)	13 (351)
21-23			11 (396)
ALL WHITES			
≤15	36% (22)	24% (19)	26% (32)
16-17	31 (157)	15 (119)	9 (131)
18		19 (150)	13 (156)
19-20		18 (301)	9 (310)
21-23			9 (362)
Low SES			
≤15	16% (10)	5% (7)	16% (10)
16-17	34 (42)	22 (41)	4 (57)
18		19 (39)	7 (42)
19-20		17 (71)	16 (80)
21-23			14 (67)
Medium/High SES			
≤15	59% (10)	46% (7)	29% (14)
16-17	30 (96)	11 (66)	11 (62)
18		16 (94)	14 (94)
19-20		18 (198)	7 (200)
21-23			7 (261)
ALL BLACKS			
≤15	83% (29)	45% (16)	38% (16)
16-17	75 (57)	53 (43)	51 (36)
18		50 (24)	34 (23)
19-20		51 (53)	37 (41)
21-23			33 (34)
Low SES			
≤15	86% (14)	47% (7)	40% (8)
16-17	79 (22)	46 (20)	51 (21)
18		59 (12)	31 (13)
19-20		53 (25)	44 (19)
21-23			58 (14)
Medium/High SES			
≤15	69% (6)	~ (3)	~ (3)
16-17	30 (16)	60% (9)	48% (6)
18		35 (8)	37 (8)
19-20		47 (20)	29 (14)
21-23			23 (13)

~: n < 5
-: n = 0

SES measured as the mean of four variables--occupation of head of household, mother's education, father's education, and presence of reading materials in the home of origin. Variables were standardized to have a mean of 10 and a standard deviation of 3. N's in parentheses.

Table 4: Percent of Female Headed Households Among Respondents With Children Under 18, By Age at First Birth, Race and Socioeconomic Background (Panel Study of Income Dynamics)

Age of Respondent at First Birth	Socioeconomic Background		
	All Backgrounds	Low SES	Medium/High SES
ALL RACES			
≤15	29% (70)	22% (37)	36% (33)
16-17	31 (247)	30 (115)	33 (132)
18	34 (187)	35 (79)	32 (108)
19-20	26 (221)	43 (77)	17 (144)
21-23	24 (464)	31 (163)	20 (301)
≥24	26 (634)	31 (192)	24 (442)
WHITES			
≤15	6 (17)	0 (6)	9 (11)
16-17	7 (89)	3 (32)	9 (57)
18	18 (84)	17 (23)	18 (61)
19-20	12 (136)	16 (31)	10 (105)
21-23	12 (308)	12 (75)	12 (233)
≥24	17 (435)	22 (102)	15 (333)
BLACKS			
≤15	36 (53)	26 (31)	50 (22)
16-17	45 (158)	40 (83)	51 (75)
18	47 (103)	43 (56)	51 (47)
19-20	49 (85)	61 (46)	36 (39)
21-23	48 (156)	48 (88)	48 (68)
≥24	48 (199)	41 (90)	53 (109)

Table 5: Percent of Female Headed Households among Respondents Ever Having Children by Ages 18, 21, and 24 by Age at First Birth Relative to Age at First Marriage, Race and Socioeconomic Background (National Longitudinal Survey)

Age at First Birth Relative to Age at First Marriage	at Age 18		at Age 21		at Age 24	
ALL RACES						
Premarital	80%	(85)	51%	(129)	31%	(163)
Ambiguous	32	(98)	17	(274)	10	(405)
Post-marital	26	(76)	18	(308)	12	(570)
ALL WHITES						
Premarital	66%	(27)	35%	(64)	21%	(97)
Ambiguous	28	(80)	14	(233)	8	(364)
Post-marital	21	(70)	16	(282)	10	(530)
Low SES						
Premarital	33%	(5)	50%	(13)	21%	(31)
Ambiguous	26	(22)	17	(53)	4	(105)
Post-marital	31	(22)	14	(90)	15	(119)
Medium & High SES						
Premarital	84%	(18)	28%	(39)	17%	(56)
Ambiguous	27	(53)	13	(158)	7	(217)
Post-marital	17	(36)	16	(159)	8	(358)
ALL BLACKS						
Premarital	86%	(59)	67%	(65)	45%	(66)
Ambiguous	51	(18)	34	(41)	29	(41)
Post-marital	70	(7)	35	(27)	39	(40)
Low SES						
Premarital	93%	(24)	68%	(29)	51%	(34)
Ambiguous	56	(10)	28	(19)	28	(20)
Post-marital	~	(3)	42	(13)	56	(17)
Medium & High SES						
Premarital	88%	(16)	68%	(18)	36%	(17)
Ambiguous	52	(5)	31	(15)	33	(13)
Post-marital	~	(1)	18	(6)	20	(14)

Table 6: Percent of Female Headed Households Among Respondents With Children Under 18, By Age at First Birth Relative to Age at First Marriage, Race and Socioeconomic Background (Panel Study of Income Dynamics)

Age at First Birth Relative to Age at First Marriage	Socioeconomic Background		
	All Backgrounds	Low SES	Medium/High SES
ALL RACES			
Premarital	46% (263)	39% (131)	53% (132)
Same Year	14 (230)	19 (91)	11 (139)
Postmarital	20 (1224)	27 (398)	17 (826)
WHITES			
Premarital	24 (41)	30 (20)	19 (21)
Same Year	5 (115)	10 (31)	4 (84)
Postmarital	11 (879)	12 (209)	11 (670)
BLACKS			
Premarital	50 (222)	40 (111)	60 (111)
Same Year	23 (115)	23 (60)	22 (55)
Postmarital	42 (345)	44 (189)	40 (156)

Multivariate Analysis: National Longitudinal Survey-Female Headed Families

NLS attainment analyses will focus on status at age 24, while all mothers with children under age 18 are included in the PSID regression.

Table 7 reports multiple regression analyses of the probability that an NLS mother is a female household head at age 24. In the second regression, only age at first birth is included, along with appropriate controls. In the first regression, age at marriage and whether the birth was premarital are also included.

When the age at marriage and premarital dummy variables are not included, a first birth before age 16 is associated with a higher probability of being a female household head at age 24, but this association actually becomes negative (and statistically significant) when the age at marriage and premarital variables are included. Having already found that age at marriage is the more critical predictor of divorce (Moore, et al., 1978d), and knowing that premarital births constitute the other principal route by which female-headed households are formed, it is not surprising that these variables supplant age at first birth. The finding that, controlling for age at marriage, early childbearers are somewhat less likely to be household heads at age 24 may be explained by the somewhat lower frequency of divorce among early childbearers that is noted when age at marriage is controlled (Moore, et al., 1978d).

The absence of an association between AFDC benefit level and the probability of being a female-headed household is worth noting. A conclusion of no association must be tempered, of course, by the caveat that the welfare variable measures only the AFDC benefit level for the region of residence; this may simply be too crude a measure to pick up any existing association. (This question will receive further consideration in the discussion of the PSID regressions.)

Table 7: Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Being a Female Household Head With Children at Age 24 on Age at First Birth, and Controls for Respondent Background, With and Without Measures of Age at First Marriage and Premarital First Birth, Among Respondents Ever Having Children by Age 24 (National Longitudinal Survey)

	With Age At Marriage and Timing		Without Age At Marriage	
Independent Variables	b's	Betas	b's	Betas
Age at First Birth				
10-15	.005	.003	.119 **	.069 **
16-17	.017	.017	.027	.028
18	.017	.018	.031	.032
19-20	.027	.036	.010	.013
21-23	a	a	a	a
Age at First Marriage				
10-15	.092	.044	--	--
16-17	-.054	-.061	--	--
18	-.018	-.021	--	--
19-20	-.086 *	-.12 *	--	--
21-23	a	a	--	--
Premarital First Birth	.11 **	.11 **	--	--
Parental Socioeconomic Status	-.010	-.067	-.010	-.067
Education at Age 24 (in years)	-.0004	-.0020	.000	-.002
AFDC Benefit Level at Age 24	.000	.029	.000	.033
Unemployment Rate at Age 24	-.005	-.032	-.004	-.026
Intact Family of Origin	-.033	-.035	-.034	-.037
Age in 1968	-.025 **	-.11 **	-.022 **	-.095 **
Pacific Coast	.065	.067	.060	.062
Race (1 = White)	-.22 ***	-.22 ***	-.26	-.25
Constant	1.01		.92	
F	6.69		7.42	
R^2	.126		.100	
N	889.		889.	

* p <.05
** p <.01
*** p <.001
a = omitted category
-- = omitted from this regression

The unemployment rate does not predict to the probability of being a female household head at age 24. Whether this reflects the offsetting effects of male unemployment, (which might trigger divorce) with female unemployment (which might foster dependence), or the absence of an effect of the unemployment rate on female household headedness is not known.

No association is found here between education or parental socioeconomic status and the likelihood of being a female family head.

Respondents from more recent birth cohorts, blacks, and (non-significantly) young women living on the Pacific Coast are all more likely to be female household heads. This is not surprising, given that these factors were all found to increase the probability of marital disruption. Finally, coming from an intact family of origin, while associated with a lower probability of being a female household head, is not statistically significant. Since this variable was not found to be associated with the probability of marital disruption, the slight effect may derive from its association with out-of-wedlock sex and childbearing (Moore and Caldwell, 1976).

Multivariate Analysis: Panel Study of Income Dynamics--Female Headed Families

The most striking difference between the two analyses is the increase in variance explained using the PSID data--from 13 to 33 percent--presumably because of the additional variables available for inclusion in the regression equation (see Table 8).

Results from the PSID regressions are similar to those using the NLS data in that we again find no evidence that an early birth increases the likelihood of later being a female family head. Indeed, women delaying their first birth are most likely to be heading their own families at the time of the PSID interview. Women who have never married are considerably more likely to be heading their families, as one would expect; the adjusted probability that an unmarried mother in this sample heads her own family is .90 (not shown). This pattern of results is very similar to that found in the analysis of divorce and separation (Moore, et al., 1978c), which is not surprising since most women who become female heads of families do so because of a divorce, particularly when only women with children under age 18 are considered. An early marriage clearly elevates the probability that a mother will later head her own family. Net of an early marriage, an early birth actually reduces the likelihood that a woman will be a female family head. Perhaps the economic and family demands experienced by early childbearers create a press to remain married, to remarry quickly, or to live in someone else's household if not married.

In this analysis we do find an association between AFDC benefit levels in the woman's state of residence and the probability that a woman heads her own family. Each $10 increase in the monthly benefit is associated with a 0.3 percent increase in the probability of being a female family head, a small but statistically significant increment.

Table 8 : Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Being a Female Household Head in 1976 on Age at First Birth, With Controls for Family Background, Social and Demographic Factors, Among Respondents With Children Under 18 (Panel Study of Income Dynamics)

Independent Variables	b	beta
Age at First Birth		
≤15	-.234***	-.101***
16-17	-.162***	-.125***
18	-.117**	-.080**
19-20	-.047	-.046
21-23	-.025	-.025
≥24	a	a
Age at First Marriage		
≤15	.148*	.078*
16-17	.173***	.151***
18	.071	.057
19-20	.046	.045
21-23	.043	.039
≥24	a	a
Never married	.738***	.364***
Education		
<12 years	.124***	.132***
12 years	.004	.004
>12 years	a	a
Number of Children	-.014*	-.067*
Proportion of Years Worked Since 18	.173***	.130***
Monthly Earnings (Potential)	.0001*	.054*
Race (1 = White)	-.212***	-.235***
Parental Socioeconomic Status	.006	.034
Age in 1976	.002	.042
Pacific Residence (1 = Yes)	.025	.017
Metropolitan Residence (1 = Yes)	.081***	.082***
Timing of First Birth (1 = premarital)	.098**	.083**
Child Under 6 (1 = Yes)	-.086***	-.092***
Physical Limitation (1 = Yes)	.130***	.095***
Catholic (1 = Yes)	-.025	-.022
Religiosity Scale	-.015*	-.042*
AFDC Benefit Level	.0003*	.066*
Unemployment Rate	-.000	-.000
Market for Females vs. Males (1 = worse)	.000	.000
Divorce Rate	.014	.045
Male Wage	-.002	-.002
Constant	-.091	
F_2	28.440	
R^2	.329	
N	1,700.	

* = p < .05
** = p < .01
*** = p < .001

a = omitted category

A number of results are quite similar to NLS results. A premarital first birth significantly increases the probability of being a female head in both data sets. In both analyses, black women are considerably more likely to head their own families. Parental socioeconomic status and the local unemployment rate have no effect in either regression. Living on the Pacific Coast is associated with a higher incidence of female headedness in both analyses, though the coefficient is non-significant in the PSID equation, probably because a variable measuring the state divorce rate was included in that equation.

The cohort effect noted in the NLS data disappears in the PSID sample; perhaps the youngest women are experiencing particularly rapid changes in family structure. Finally, only in the PSID analysis does education appear to have an effect; this may be explained by the use of the linear variable in the NLS analyses, since only those PSID women with less than a high school diploma have a higher probability of being a female head.

The rich variable list used in the PSID regression produces a number of interesting additional findings. The presence of a child under age 6 reduces the probability of being a female family head, presumably because women with young children are less able or willing to head a household. Women with larger families are also slightly less likely to head their own households, even net of the presence of a young child. The presence of a physical limitation also increases the probability that a woman is a female head, which, we have argued, reflects a health-based attractiveness as a marriage partner.

Greater religiosity, as measured by church attendance, and being Catholic reduce the odds of being a female head slightly, though only

religiosity is statistically significant. The state divorce rate is not related to female headedness, but residing in a metropolitan area is. This may occur because single women move to urban areas and/or because marital break-up is more frequent in cities.

Finally, a number of employment related variables merit discussion. The proportion of years that a woman has worked since turning 18 is positively and strongly related to being a female family head; however the causal direction of this relationship is uncertain. It seems likely that many women may have worked a long time because they are heading families. On the other hand, their employment may reflect inadequate performance on the part of a husband which led to divorce. Or it may represent the independence effect of work experience for women in unsatisfactory marriages. Neither the relative job market for females versus males nor the typical male wage are related to female headedness; but the woman's potential wage is. As the estimated monthly earnings of women (real or potential) increase by $100, the likelihood that a woman is a female family head increases by 1 percent. Again, however, the direction of causality is uncertain. Women with higher earnings may be more willing and able to strike out on their own, or women who find they need money to support a family may tend to maximize earnings.

In sum, early childbearing does not seem to increase the probability that a woman will head her own family. If anything, women who began childbearing in their teens are less likely to be female heads, net of other influences. However, teenage bridges are more likely to later be female heads. Other factors found associated with a higher probability of female headedness include a low education, being black, extensive work experience and relatively high earning ability, metropolitan residence,

higher AFDC benefits, and having some kind of physical limitation. The probability of being a female head is slightly lower among women who attend church relatively often and those who have larger families. Women with a child under age 6 are considerably less likely to be female heads.

RESULTS: WELFARE RECEIPT

The Simple Association Between Age at First Birth and Welfare Dependency

The reasons for being concerned with the female-headed family as a form of social structure do not include a belief that this family type is inherently problematic or inferior. (For a discussion of this complicated issue, see Ross and Sawhill, 1975). However, the poverty of this family form is a matter of concern. Although most female-headed families are not dependent upon welfare support (U.S. Bureau of the Census, 1974), it is from this family type that most AFDC families are drawn. Therefore, the association between age at first birth and welfare dependency will be explored among those respondents who are female family heads, as well as among that larger group of all respondents who have ever had children.

The data presented in Tables 9-11 and the top panel of Table 13 are strongly suggestive of an association between early childbearing and welfare dependency. Particularly when only female household heads are considered, a substantially higher proportion of early childbearers live in a family in which someone receives welfare assistance. (As noted earlier, only among female heads are we fairly certain that the recipient is the young mother herself.)

Tables 12, 14, 15 and the bottom panel of Table 13 support the contention that out-of-wedlock childbearing is associated with welfare dependency. In every instance, NLS young women who had premarital first births are more likely to live at age 24 in family units that receive welfare assistance. Among PSID women, the same association holds for white women and upper status black women. When only female household heads are considered, the association holds among whites and to some extent among blacks. However, the majority of

black female household heads are receiving welfare assistance, regardless of the timing of their first birth.

These results are in line with other research suggesting that teenage mothers are disproportionately represented among recipients of Aid to Families with Dependent Children (Moore, 1978c). About half of the total expenditures through this program were estimated to go to households in which the mother bore her first child as a teenager. Among women aged 14 to 30 in households receiving AFDC, 61 percent had borne their first child while a teenager. Considering the issue from a different perspective, the proportion of women 14 to 30 living in households receiving AFDC was estimated. Among teenage mothers, 25 percent were later receiving AFDC, while only 10 percent of the older mothers lived in AFDC households. However, this analysis too is based on cross tabulations. It is critical to explore these gross associations in models that control for other factors that affect the probability of welfare dependency.

Table 9: Percent of Respondents Living in a Household in Which Someone Receives Welfare Among Respondents Ever Having Children by Ages 18, 21, and 24 by Age at First Birth, Race, and Socioeconomic Background (National Longitudinal Survey)

Age of Respondent at First Birth	at age 18*		at age 21*		at age 24*	
ALL RACES						
≤15	39%	(51)	27%	(34)	24%	(48)
16–17	18	(213)	19	(163)	17	(167)
18			11	(175)	9	(179)
19–20			9	(353)	5	(351)
21–23					3	(396)
ALL WHITES						
≤15	29%	(22)	8%	(19)	13%	(32)
16–17	14	(157)	13	(119)	11	(131)
18			9	(150)	4	(150
19–20			8	(301)	4	(310)
21–23					2	(362)
Low SES						
≤15	43%	(10)	5%	(7)	16%	(10)
16–17	15	(42)	13	(41)	9	(57)
18			16	(39)	6	(42)
19–20			4	(71)	7	(80)
21–23					3	(67)
Medium/High SES						
≤15	16%	(10)	19%	(7)	19%	(14)
16–17	11	(96)	7	(66)	12	(62)
18			7	(94)	2	(94)
19–20			9	(196)	2	(200)
21–23					1	(261)
ALL BLACKS						
≤15	47%	(29)	50%	(16)	44%	(16)
16–17	29	(57)	37	(43)	35	(36)
18			25	(24)	42	(23)
19–20			17	(53)	12	(41)
21–23					22	(34)
Low SES						
≤15	41%	(14)	43%	(7)	40%	(8)
16–17	27	(22)	36	(20)	29	(21)
18			27	(12)	39	(13)
19–20			14	(25)	13	(19)
21–23					29	(14)
Medium/High SES						
≤15	27%	(6)	~	(3)	~	(3)
16–17	21	(16)	26%	(9)	58%	(6)
18			17	(8)	52	(8)
19–20			12	(20)	5	(14)
21–23					18	(13)

*Respondents turning 18, 21, and/or 24 between 1968 and 1972.

~: n < 5

-: n = 0

SES measured as the mean of four variables—occupation of head of household, mother's education, father's education, and presence of reading materials in the home of origin. Variables were standardized to have a mean of 10 and a standard deviation of 3.
N's in parentheses.

Table 10: Percent of Respondents with Children Under 18 Living in a Household in Which Someone Receives Welfare, By Age at First Birth, Race, and Socioeconomic Background (Panel Study of Income Dynamics)

Age of Respondent at First Birth	Socioeconomic Background		
	All Backgrounds	Low SES	Medium/High SES
ALL RACES			
≤15	27% (70)	24% (37)	30% (33)
16-17	23 (247)	20 (115)	26 (132)
18	20 (187)	23 (79)	18 (108)
19-20	16 (221)	23 (77)	12 (144)
21-23	12 (464)	18 (163)	9 (301)
≥24	13 (634)	20 (192)	11 (442)
WHITES			
≤15	6 (17)	17 (6)	0 (11)
16-17	10 (89)	6 (32)	12 (57)
18	8 (84)	17 (23)	5 (61)
19-20	4 (136)	6 (31)	4 (105)
21-23	4 (308)	5 (75)	4 (233)
≥24	4 (435)	8 (102)	2 (333)
BLACKS			
≤15	34 (53)	26 (31)	46 (22)
16-17	30 (158)	25 (83)	36 (75)
18	29 (103)	25 (56)	34 (47)
19-20	35 (85)	35 (46)	36 (39)
21-23	28 (156)	28 (88)	26 (68)
≥24	35 (199)	33 (90)	36 (109)

Table 11: Percent of Female Household Heads With Children Under 18 Receiving Welfare, By Age at First Birth, Race, and Socioeconomic Background (Panel Study of Income Dynamics)

Age of Respondent at First Birth	Socioeconomic Background		
	All Backgrounds	Low SES	Medium/High SES
ALL RACES			
≤15	75% (20)	75% (8)	75% (12)
16-17	53 (77)	47 (34)	58 (43)
18	48 (63)	46 (28)	49 (35)
19-20	53 (58)	54 (33)	52 (25)
21-23	40 (111)	45 (51)	37 (60)
≥24	44 (168)	52 (60)	39 (108)
WHITES			
≤15	~ (1)	- (0)	~ (1)
16-17	33 (6)	~ (1)	40 (5)
18	27 (15)	~ (4)	18 (11)
19-20	25 (16)	~ (5)	18 (11)
21-23	22 (36)	11 (9)	26 (27)
≥24	15 (73)	26 (23)	10 (50)
BLACKS			
≤15	79 (19)	75 (8)	82 (11)
16-17	55 (71)	48 (33)	60 (38)
18	54 (48)	46 (24)	62 (24)
19-20	64 (42)	57 (28)	79 (14)
21-23	49 (75)	52 (42)	46 (33)
≥24	65 (95)	68 (37)	64 (58)

~ : n < 5
- : n = 0

Table 12: Percent of Respondents Living in a Household in Which Someone Receives Welfare Among Respondents Ever Having Children by Ages 18, 21, and 24 by Age at First Birth Relative to Age at First Marriage, Race, and Socio-economic Background (National Longitudinal Survey)

Age at First Birth Relative to Age at First Marriage	At Age 18		At Age 21		At Age 24	
ALL RACES						
Premarital	39%	(85)	29%	(129)	22%	(163)
Ambiguous	14	(98)	10	(274)	7	(405)
Post-marital	12	(76)	6	(308)	4	(570)
ALL WHITES						
Premarital	31%	(27)	17%	(64)	13%	(97)
Ambiguous	12	(80)	10	(233)	5	(364)
Post-marital	13	(70)	5	(282)	2	(530)
Low SES						
Premarital	33%	(5)	33%	(13)	17%	(31)
Ambiguous	21	(22)	12	(53)	4	(105)
Post-marital	13	(22)	3	(90)	6	(119)
Medium & High SES						
Premarital	24%	(18)	13%	(39)	12%	(56)
Ambiguous	6	(53)	7	(158)	5	(217)
Post-marital	13	(36)	7	(159)	1	(358)
ALL BLACKS						
Premarital	42%	(59)	41%	(65)	35%	(66)
Ambiguous	21	(18)	16	(41)	18	(41)
Post-marital	4	(7)	18	(27)	23	(40)
Low SES						
Premarital	38%	(24)	41%	(29)	35%	(34)
Ambiguous	25	(10)	18	(19)	14	(20)
Post-marital	10	(3)	10	(13)	23	(17)
Medium & High SES						
Premarital	30%	(16)	32%	(18)	38%	(17)
Ambiguous	5	(5)	6	(15)	27	(13)
Post-marital		(1)	16	(6)	15	(14)

Table 13: Percent of Female Heads of Household Receiving Welfare at Ages 18, 21, and 24, by Age at First Birth and by Timing of First Birth Relative to First Marriage (National Longitudinal Survey)

Age of Respondent at First Birth	...at Age 18		...at Age 21		...at Age 24	
(All Races)						
15	59 %	(9)	73 %	(8)	60 %	(13)
16-17	33	(30)	62	(24)	52	(26)
18			31	(19)	34	(22)
19-20			31	(43)	29	(35)
21-23					37	(23)
		(39)		(84)		(119)
Age at First Birth Relative to Age at First Marriage						
(All Races)						
Premarital	41 %	(19)	58 %	(31)	63 %	(37)
Ambiguous	30	(12)	39	(26)	40	(32)
Post-Marital	33	(5)	25	(33)	23	(50)
		(36)		(90)		(119)

Table 14: Percent of Respondents With Children Under 18 Living in a Household in Which Someone Receives Welfare, By Age at First Birth Relative to Age at First Marriage, Race, and Socioeconomic Background (Panel Study of Income Dynamics)

Age at First Birth Relative to Age at First Marriage	Socioeconomic Background		
	All Backgrounds	Low SES	Medium/High SES
ALL RACES			
Premarital	35% (263)	30% (131)	39% (132)
Same Year	15 (230)	20 (91)	12 (139)
Postmarital	10 (1,224)	16 (398)	8 (826)
WHITES			
Premarital	15 (41)	25 (20)	5 (21)
Same Year	10 (115)	19 (31)	6 (84)
Postmarital	3 (879)	3 (209)	3 (670)
BLACKS			
Premarital	28 (222)	31 (111)	46 (111)
Same Year	20 (115)	20 (60)	20 (55)
Postmarital	29 (345)	30 (189)	28 (156)

Table 15: Percent of Female Household Heads With Children Under 18 Receiving Welfare by Age at First Birth Relative to Age at First Marriage, Race and Socioeconomic Background (Panel Study of Income Dynamics)

Age at First Birth Relative to Age at First Marriage	Socioeconomic Background		
	All Backgrounds	Low SES	Medium/High SES
ALL RACES			
Premarital	63% (121)	57% (51)	67% (70)
Same Year	59 (32)	65 (17)	53 (15)
Postmarital	42 (245)	50 (107)	36 (138)
WHITES			
Premarital	30 (10)	33 (6)	~ (4)
Same Year	33 (6)	~ (3)	~ (3)
Postmarital	15 (99)	17 (24)	15 (75)
BLACKS			
Premarital	66 (111)	60 (45)	70 (66)
Same Year	65 (26)	64 (14)	67 (12)
Postmarital	60 (146)	60 (83)	60 (63)

~: n < 5
-: n = 0

Multivariate Analysis: National Longitudinal Survey--Welfare

Multiple regressions of the probability of receiving welfare on age at first birth and control variables are reported in Tables 16 and 17 for respondents ever having children and for female heads of households, respectively. In each analysis, the regression was run twice, without and then with age at first marriage.

In both samples, the young woman whose first birth occured premaritally is considerably more likely to live in a welfare household. An early birth also seems to increase the likelihood of living in a welfare household when the sample of all mothers is considered, but this finding is not replicated in the female head sample. Since this association actually becomes negative when female heads are considered, it would appear that the positive coefficient may be due to the absence of an important control variable. In fact, in the PSID analysis of all mothers, in which years as a female head is included along with other controls, the association between age at first birth and welfare receipt does become negative. The slight positive association between early marriage and welfare recipiency in the female head sample may also be such an artifact, since it is not significant in the PSID analysis. These variables will be discussed further when results from the PSID analyses are presented.

In both sub-samples, the young woman's educational attainment is a strong predictor of welfare dependency. Each year of additional schooling reduces the probability of welfare by about two percent for women ever having children and by about one percent among female household heads. To the extent that early childbearing has interfered with the educational attainment of these young women, early childbearing can be seen as having an indirect effect on the probability of welfare dependency.

Table 16: Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Respondent Living in Household Receiving Welfare at Age 24 on Age at First Birth, and Controls for Respondent Background, Among Respondents Ever Having Children (National Longitudinal Survey)

Independent Variables	Without Age at Marriage		With Age at Marriage	
	b's	Betas	b's	Betas
Age at First Birth				
<16	.034	.026	.055	.042
16-17	.051	.069	.087 *	.118 *
18	.004	.006	.016	.022
19-20	-.13	-.022	-.006	-.010
21-23	a	a	a	a
Timing of First Birth (Premarital)	.090 ***	.120 ***	.076 **	.102 **
Age at First Marriage				
<16	-	-	-.012	-.008
16-17	-	-	-.054	-.080
18	-	-	-.005	-.008
19-20	-	-	-.014	-.025
21-23	-	-	a	a
Race	-.192 ***	-.247 ***	-.189 ***	-.243 ***
Education (Years Completed at Age 24)	-.024 ***	-.177 ***	-.025	-.181
Unemployment Rate	-.004	-.034	-.003	-.033
Intact Family of Origin	-.038	-.054	-.038	-.054
Age in 1968	-.021 ***	-.119 ***	-.022 ***	-.122 ***
South	-.074 *	-.134 *	-.070 *	-.127 *
AFDC Benefits	.000	.006	.000	.007
Demand for Female Labor	-.005 **	-.084 **	-.005 *	-.083 *
Parental Socioeconomic Status	.002	.021	.003	.023
Constant	1.16		1.17	
R^2	.188		.191	
F	14.42		11.38	
N	.889		.889	

* p <.05
** p <.01
*** p <.001
a = omitted category
\- = variable omitted

Table 17: Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Receiving Welfare at Age 24 on Age at First Marriage and Controls for Respondent Background Among Respondents Who are Female Household Heads (National Longitudinal Survey)

Independent Variables	Without Age at Marriage b's	Without Age at Marriage Betas	With Age at Marriage b's	With Age at Marriage Betas
Age at First Birth				
<16	-.100	-.063	-.443	-.280
16-17	-.116	-.098	-.400	-.337
18	-.165	-.130	-.310	-.244
19-20	-.222	-.206	-.342*	-.318 *
21-23	a	a	a	a
Timing of First Birth (1 = Premarital)	.143	.135	.279	.264
Age at First Marriage				
<16	-	-	.430	.219
16-17	-	-	.452*	.360 *
18	-	-	.141	.132
19-20	-	-	.152	.118
21-23				
Parental SES	-.006	-.026	-.025	-.110
Education (Years Completed)	-.102 ***	-.419 ***	-.096**	-.394 **
AFDC Benefit Level in Region	.000	.060	.000	.006
Unemployment Rate	-.017	-.083	-.020	-.100
Demand for Female Labor in Local Labor Market	-.020 *	-.228 *	-.025 *	-.281 *
Race	-.207	-.204	-.261 *	-.258 *
South	-.306	-.290	-.422	-.399
Intact Family of Origin	-.077	-.070	-.084	-.076
Age in 1968	-.061	-.188	-.052	-.159
Constant	3.88		4.05	
R^2	.435		.471	
F	3.46		2.99	
N	78		78	

* p <.05
** p <.01
*** p <.001

a = omitted category
— = variable omitted

The level of AFDC benefits in the region of residence and the local unemployment rate do not seem to affect the probability of welfare in either of these sets of regressions. The demand for female labor, however, does have a significant impact among both sub-samples. One might make the hopeful interpretation that young women are drawn away from welfare recipiency by relatively good employment opportunities for women.

A less optimistic finding is that young birth cohorts seem to have a higher probability of receiving welfare, even net of the employment and background measures. This fits with the awareness that the frequency of welfare recipiency has been rising during recent years. The strongly significant coefficient for respondent's race is in keeping with the higher incidence of black welfare dependency, but it is an unsettling finding since it is net of the impact of several important controls. Since additional controls are available in the PSID data, this too will be discussed in the next section. Being from the South lowers the probability of welfare recipiency, presumably because of lower acceptance rates in welfare programs in the South.

Although the impact of being from an intact family is only statistically significant in one of the regressions, it is consistently associated with a lower probability of receiving welfare. On the other hand, the socioeconomic status of the family of origin is not related to the receipt of welfare.

Multivariate Analysis: Panel Study of Income Dynamics--Welfare

Results from regressions on the entire sample of PSID women who have children under age 18 do not differ substantively from results based on only the female household heads, nor are results different for the subset of younger female heads (See Tables 18-20). Because of the smaller sample sizes, statistical significance is attenuated in the analyses of female heads, but the direction and magnitude of findings are highly comparable, with several minor expections, which will be noted. Since the patterns are quite similar, results presented in the three tables will therefore be discussed together.

Early childbearing is negatively associated with the probability of receiving welfare among these samples; that is once all other factors are taken into account, women who had their first child while teenagers are less likely to receive welfare assistance. Early marriage is associated with a higher probability of welfare receipt among female heads, but the association is not statistically significant. As in the NLS regressions, a premarital first birth tends to be associated with welfare receipt among all samples, though only among young female heads is the association significant. Clearly when the effect of critical control variables is taken account of, the negative impact of these variables is reduced or eradicated. However, this does not mean that an early birth or marriage has no effect. The effect can be indirect, transmitted through variables that are directly or indirectly affected by an early birth, for example, education (Moore, et al., 1978a) family size (Moore and Hofferth, 1978b), and labor force participation or earnings.

There is a strong and statistically significant effect of family size on the probability that a mother will require welfare assistance. Among female heads who are under age 35, for each additional child, the likelihood that they will have received welfare rises by 8 percent. For the sample of all female heads, each additional child raises the probability of welfare receipt by 6 percent.

Table 18: Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Respondent Living in a Household Receiving Welfare in 1976 on Age at First Birth, With Controls for Family Background, Social and Demographic Factors, Among Respondents With Children Under 18 (Panel Study of Income Dynamics)

Independant Variables	b	beta
Age at First Birth		
≤15	-.079	-.041
16-17	-.108**	-.101**
18	-.117***	-.097***
19-20	-.031	-.037
21-23	-.017	-.020
≥24	a	a
Age at First Marriage		
≤15	.006	.004
16-17	.047	.049
18	-.014	-.014
19-20	.013	.015
21-23	-.018	-.020
≥24	a	a
Never married	.230***	.138***
Education		
<12 years	.113***	.147***
= 12 years	.012	.016
>12 years	a	a
Number of Children	.026***	.149***
Proportion of Years Worked Since 18	-.055*	-.030*
Monthly Earnings (Potential)	-.0002***	-.115***
Race (1 = White)	-.093***	-.125***
Parental Socioeconomic Status	.007	.044
Age in 1976	-.007***	-.144***
Pacific Residence (1 = Yes)	.062*	.032*
Metropolitan Residence (1 = Yes)	.037*	.045*
Alimony/Child Support	-.059*	-.042*
Timing of First Birth (1 = Premarital)	.042	.043
Child Under 6 (1 = Yes)	.004	.005
Physical Limitation (1 = Yes)	.109***	.097***
Years as Female-Headed Household		
≤1	-.416***	-.541***
2-3	-.281***	-.225***
4-5	-.186***	-.138***
6-7	-.120***	-.075***
≥8		
AFDC Benefit Level	.0002**	.065**
Unemployment Rate	-.001	-.002
Market for Females vs. Males (1 = worse)	-.030*	-.039*
Male Wage	-.000	-.000
Constant	.586	
F	36.292	
R^2	.418	
N	1,700.	

* = p < .05
** = p < .01
*** = p < .001

a = omitted category

Table 19: Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Receiving Welfare in 1976 on Age at First Birth, With Controls For Family Background, Social and Demographic Factors, Among Female Household Heads With Children Under 18 (Panel Study of Income Dynamics)

Independent Variables	b	beta
Age at First Birth		
≤15	-.040	-.016
16-17	-.189*	-.137*
18	-.194*	-.129*
19-20	.008	.007
21-23	-.002	-.002
≥24	a	a
Age at First Marriage		
≤15	.207	.095
16-17	.114	.092
18	-.008	-.005
19-20	.052	.039
21-23	-.035	-.025
≥24	a	a
Never married	.096	.080
Education		
<12 years	.115	.115
=12 years	-.043	-.042
>12 years	a	a
Number of Children	.060***	.233***
Proportion of Years Worked Since 18	-.199**	-.131**
Monthly Earnings (Potential)	-.0004***	-.227***
Race (1 = White)	-.145*	-.132*
Parental Socioeconomic Status	.026*	.113*
Age in 1976	-.012*	-.180*
Pacific Residence (1 = Yes)	.105	.069
Metropolitan Area Residence (1 = Yes	.140*	.100*
Timing of First Birth (1 = Premarital)	.086	.083
Alimony/Child Support (1 = Received)	-.098*	-.083*
Child Under 6 (1 = Yes)	.034	.030
Physical Limitation (1 = Yes)	.103	.080
Years as a Female-Headed Household		
≤1	-.302**	-.137**
2-3	-.040	-.029
4-5	-.102	-.083
6-7	-.034	-.025
≥8	a	a
AFDC Benefit Level	.0004	.096
Unemployment Rate	.001	.004
Market for Females vs. Males (1 = worse)	-.053	-.052
Male Wage	-.062	-.057
Constant	.652	
F_2	9.478	
R^2	.461	
N	400.	

* = p < .05
** = p < .01
*** = p < .001

a = omitted category

Table 20: Partial Regression Coefficients (Standardized and Unstandardized) of the Probability of Receiving Welfare in 1976 on Age at First Birth, With Controls For Family Background, Social and Demographic Factors, Among Female Household Heads Who Are Under Age 35 Who Have Children Under 18 (Panel Study of Income Dynamics)

Independent Variables	b	beta
Age at First Birth		
≤15	-.121	-.049
16-17	-.197	-.167
18	-.310	-.239
19-20	-.035	-.031
21-23	.056	.044
≥24	a	a
Age at First Marriage		
≤15	.426	.169
16-17	.351	.260
18	.193	.113
19-20	.109	.080
21-23	.069	.036
≥24	a	a
Never married	.228	.226
Education		
<12 years	.133	.131
=12 years	.040	.040
>12 years	a	a
Number of Children	.084*	.220*
Proportion of Years Worked Since 18	-.232	-.153
Monthly Earnings (Potential)	-.0005**	-.266**
Race (1 = White)	.015	.013
Parental Socioeconomic Status	.038*	.169*
Age in 1976	.001	.005
Pacific Residence (1 = Yes)	.063	.038
Metropolitan Area Residence (1 = Yes)	.206	.154
Timing of First Birth (1 = Premarital)	.340*	.336*
Alimony/Child Support (1 = Received)	-.112	-.097
Child Under 6 (1 = Yes)	.014	.014
Physical Limitation (1 = Yes)	.152	.090
Years as a Female-Headed Household		
≤1	-.230	-.123
2-3	.056	.047
4-5	-.085	-.077
6-7	.045	.037
≥8	a	a
AFDC Benefit Level	.0007	.165
Unemployment Rate	.017	.044
Market for Females vs. Males (1 = worse)	-.103	-.102
Male Wage	-.058	-.053
Constant	-.406	
F_2	3.897	
R^2	.532	
N	147.	

* = p < .05
** = p < .01
*** = p < .001

Net of family size, having a child under the age of 6 has no effect on welfare recipiency, however.

Women's educational attainment also has an impact on the probability that they will require welfare assitance. Women who have not completed high school have a probability of receiving welfare that is 11 to 13 percent higher than that of women who have at least some high school education, net of all other influences. Women who complete at least 12 years do not differ from women who have completed more than 12 years.

As in the NLS analyses, younger cohorts have a slightly higher probability of being welfare recipients. For each year that a woman is younger, the probability that she will receive AFDC or other welfare rises by approximately 1 percent. Moreover, among female heads, contrary to our expectations, the probability that a woman will receive benefits rises as the social status of her parents rises. Perhaps, net of parental influence on education, number of children and earnings, this association reflects a different kind of parental influence. Perhaps the role played by higher status parents has changed from one of assisting daughters to support their families to one of helping them identify and qualify for public assistance. The explanation for this interesting association must remain speculative, however.

A woman's employment opportunities, as in the NLS, do affect the likelihood that she will require welfare assistance. In particular, her monthly earnings (actual for employed women, estimated for non-employed women) have a significant impact in all three samples. Among female heads under age 35, for example, a $100 increase in monthly earnings reduces the probability of welfare receipt by 5 percent. Among the sample of female heads of all ages, a similar increase is associated with a 4 percent reduction.

The proportion of years that a woman has been employed since age 18 also affects the probability of welfare receipt. A female head who has worked continuously is about 20 percent less likely to live in a household that receives welfare than is a woman who has not worked at all. An increase of 10 percent in the proportion of years worked is associated with a 2 percent reduction in the probability of welfare receipt among female heads. The impact of earnings and experience are considerably smaller among the larger sample, which includes married women as well as female heads, since these factors are less critical determinants of welfare dependency among wives.

Neither the typical male wage nor the local unemployment rate are significantly associated with welfare dependency, however the relative wages of females versus males has a slight negative impact. That is, in areas where female wages are worse than male wages, women are less likely to live in households that receive welfare assistance, perhaps because males are better able to assume financial support in these areas.

One clear measure of male financial responsibility is the measure of whether women received alimony or child support. Receipt of such aid reduces the probability of welfare recipiency by about 10 percent among female heads, a substantial effect. The coefficient is not statistically significant among the small sample of younger female heads; but it is significant in both the other samples.

A factor believed to affect a woman's ability to work and/or to find a good job is the existence of a physical limitation. We do find that women with such a physical limitation are over 10 percent more likely to be welfare receipients.

Another variable that affects welfare status is respondent's race. In both the sample of all mothers and the sample of all female heads, black women were

found to be more likely to receive welfare. The coefficients for race are smaller in the PSID analyses than in the NLS analyses, presumably because of the availability of a wider array of control variables in the PSID; however, there is still a substantial race effect. Among young PSID female heads, though, there is no race effect, a surprising finding since blacks are over-represented among recipients in all other samples. Perhaps young black mothers tend to live in households headed by others and therefore do not appear in the sample. Perhaps, on the other hand, the controls available in the PSID really account for the race effect among younger women. We cannot say for sure. Overall, though, being black increases the probability of welfare receipt.

Two contextual variables also seem to be associated with the probability of welfare recipiency. Women living in metropolitan areas or living on the Pacific Coast are more likely to receive benefits in all three samples. Since these coefficients are net of the level of AFDC benefits, they presumably reflect the accessibility or acceptability of receiving welfare in cities and/or on the West Coast.

The level of AFDC benefits in a woman's state of residence is also related to the probability of welfare receipt, although only in the sample of all women does the association reach statistical significance. Inclusion of a control for residence in the South (not shown), where benefits and costs are lower, did not remove the association in this analysis as it did in the NLS regressions. The magnitude of the effect is rather small though; among female heads, an increase of $10 in the monthly benefit for a family of four is associated with an increase of 0.4 percent (.004) in the probability that a female head will be a welfare recipient. Given the small magnitude and statistical unreliability of this association, it seems clear that other factors are more important determinants of welfare dependency than the level of benefits.

Finally, the number of years that a woman was a female head over the course of the survey seems to affect the probability that she will receive welfare. Women who were female heads for only one year (or, in the case of the analysis that includes married women, women who were not female heads at all) are far less likely to receive welfare. The more years that a woman was a female head, the more likely she was to be receiving AFDC in 1975. Is this because fatigue due to the difficulty of self support sets in, so that women succumb to welfare? Is it because women gradually learn about welfare and are therefore more likely to apply as time goes by? Because being on welfare discourages remarriage, so that recipients remain female heads longer (Sawhill, et al., 1975)? Or because women with particular characteristics tend to end up both unmarried and on welfare? Whatever the explanation (and the finding deserves further study), it appears that women who make a relatively rapid turnover in and out of the female head status are less likely to require government financial assistance than are women who head their own households for some period of time.

In many ways, the pattern of results presented here is extremely reasonable. Women who are female household heads are more likely to be welfare recipients if they have numerous children, if their ability to earn money is low, if they have little work experience, if they do not receive any child support or alimony, and if they have some sort of physical limitation. In addition, women without a high school diploma, black women, and women who have been female heads for some time are more likely to receive welfare assistance. The probability of welfare receipt is also higher among women living on the Pacific Coast and women living cities and it is slightly higher among women living in states with relatively generous AFDC benefits. However, net of all of these other factors, a birth or marriage does not significantly increase

the probability of welfare dependency. However, we have seen that teenage mothers, as a group, are more likely to live in households that receive welfare support (see again, Tables 9, 10, 11, and 13). Only when critical control variables are included in the analysis does the impact of an early birth become negative (see Table 21). Teenage mothers do have a significantly higher probability of being on welfare when these controls are omitted. These results illustrate the importance of race, since only when a control for respondent race is omitted, does the association reach statistical significance. They also suggest that it is the impact of an early birth on these intermediate factors that leads, at least in part, to subsequent welfare recipiency among teenage mothers.

Table 21: Partial Regression Coefficients (Unstandardized) of Welfare Receipt on Age at First Birth Variables Among Women With Children Under Age 18--Models With and Without Controls for Number of Children, Education, Age at Marriage, Earnings, Race, and Work Experience* (Panel Study of Income Dynamics)

	Full Model	Model Without Number of Children, Education, Age at Marriage, Earnings or Work Experience	Model Without Race, Number of Children, Education, Age at Marriage, Earnings, or Work Experience
Age at First Birth			
≤15	-.079	.072	.094*
16-17	-.108**	.053	.071**
18	-.117***	.017	.030
19-20	-.031	.065**	.074
21-23	-.017	.038	.043
≥24	a	a	a

*Other variables in the model are shown in Table 18; a = omitted category.

Transition Probabilities: Public Assistance Entry and Exit

The detailed annual data on the young NLS women permit exploration of the impact of a first birth on the probability that a young woman whose household is not receiving welfare in one year is receiving public assistance the next year--welfare entry--and the probability that a young woman who is receiving public assistance one year is not a recipient the following year--welfare exit. The dependent variable in these analyses is a dichotomy in which 1 = welfare entry or exit, and 0 = no change in welfare status. The probability of change in welfare status, the transition probability, is estimated as a function of respondent characteristics as well as the occurrence of certain events, such as a first birth or marriage. Results are presented as adjusted probabilities, that is, the likelihood that a young woman will go on or go off of welfare if she has a child or marries, net of other factors (See Table 22). The full model with unadjusted coefficients is presented in Appendix Tables 3-5. (Results from a comparable analysis using PSID data are also presented in Appendix Table 6. The paucity of information of young PSID individuals who are neither heads nor wives restricts the variable list to the point that the results are fairly uninteresting. Moreover, the probability of entry is only about 1 percent, which taxes even the relaxed assumptions that permit analysis of dichotomous dependent variables. See the Methodological Appendix. For these reasons, these results are not discussed.)

As noted above, the indicator of public assistance in the NLS data is quite crude. If anyone in a family is receiving some form of public assistance, that situation is defined as receipt of public assistance. Entry onto public assistance thus implies that no one in a family received any forms of public assistance in year t, but at least one person received at least one kind of public assistance in year t+1.

Table 22: EFFECT OF FIRST BIRTH ON ENROLLMENT IN, AND EXIT FROM, PUBLIC ASSISTANCE

Independent Variables	ENTRY: ALL WOMEN Not on Public Assistance		ENTRY: UNMARRIED Women With Children		EXIT: ALL WOMEN On Public Assistance	
	Percent	Entry Probability	Percent	Entry Probability	Percent	Exit Probability
I. FIRST BIRTH						
(1) More than one year ago	24%	.06	52%	.13	45%	.37
(2) Within Previous Year	6	.08	9	.22	9	.39
(3) Within Current Year						
(3.1) Premarital	0.5	.23	6.7	.30	2.6	0*
(3.2) Uncertain Timing	1.0	.18	1.5	.32	1.4	.58
(3.3) Postmarital	4.3	.05	2.7	.18	0.9	.41
(4) No first birth yet	65	.03	27	.11	41	.47
II. OTHER MAJOR LIFE CHANGES IN CURRENT YEAR						
A. (1) Second or later birth	6%	.04	36%	.14	10%	.40
(2) No second or later birth	94	.04	64	.14	90	.40
B. (1) Marriage	9	.12	--	.14	9	.64
(2) Marital split	3	.10	42	.14	2	.50
(3) Remain not married	53	.03	58	.14	69	.31
(4) Remain married	35	.002	--	.14	20	.61
C. (1) Leave school	10	.04	3	.14	10	.33
(2) Reenter school	2	.06	1	.14	3	.27
(3) Remain in school	26	.09	4	.14	16	.37
(4) Remain not in school	62	.03	92	.14	71	.43
D. (1) Exit from work	11	.05	8	.37	10	.31
(2) Entry to work	12	.05	8	.12	14	.37
(3) Remain not working	18	.09	29	.12	32	.31
(4) Remain working	59	.02	55	.12	44	.49
Overall mean transition probability		.041		.138		.403
R^2		.16		.24		
N		19,678		1,490		1,102

Public Assistance Entry, All Women. The first entry equation was estimated on a very large pooled sample (n = 19,678) consisting of all person-years in which no public assistance receipt was reported at the start of the year. Of this large sample, 4 percent typically enter public assistance within a year. The transition rate is sharply affected by first birth status.

If the first child is at least one year old by the start of a year, the entry likelihood is increased slightly (to .06), and if the first child is less than a year old at the start of the year the increase in public assistance entry is even higher (.08). However, as we might expect, the most dramatic change in entry rates results from a current year first birth. The impact depends on the woman's marital situation. A premarital first birth leads to the highest predicted entry rate of any variable in the model (.23). But nearly as high entry rates follow a joint first birth/first marriage occurrence in the current year (.18). By way of contrast, a postmarital first birth increases entry changes only slightly (to .05). And, not surprisingly, childless women have the lowest rate of all (.03); welfare entry among this group presumably reflects entry on the part of a household member other than our respondent.

Other current year life changes also have net effects on public assistance entry. One exception is a second or later current year first birth, which seems to have no significant impact. Surprisingly, a current year marriage increases the likelihood (.12), perhaps because one effect of marriage is to enlarge the family to include another person, who may be receiving public assistance at the time of marriage. Not surprisingly, entry rates are miniscule (.002) among women who were married at the start of the year and remained so at year's end.

A marital split leads to substantially increased entry rates (.10). The effect of parting from other persons who may be receiving public assistance ought to decrease the entry chances, but that effect, if it exists, is apparently swamped by the very much higher chances of the woman herself going onto public assistance when her marriage breaks up.

Many women apparently combine entrollment in school with public assistance. As Presser (1975) suggests, welfare benefits may facilitate attendance. Those who remain in school all year have the highest entry rate (.085) and those who reenter school have the second highest rate (.055). Both those who drop from school and those already out of school have lower-than-normal entry rates.

Finally, work changes also impact entry rates. Rates are highest for women who become nonworkers during the year or who remain nonworkers throughout the year. Since marital, schooling, and work changes affect entry, a first birth has indirect impacts on entry via these changes. However, the effects are complex. For example, insofar as a first birth causes a first marriage, it increases entry rates in that year. However, insofar as the woman remains married, her entry rates are virtually zero. Since a first birth generally acts to pull women from school, it also acts via this route to decrease entry. Finally, to the extent a first birth pulls women from the workforce it indrectly increases entry.

Public Assistance Enrollment, Unmarried Women With Children Under 18. Restricting the eligible sample to unmarried women with children reduces the direct effect of marital status via its impact on eligibility status. Of the sample of such women (n = 1,490), 14 percent enroll in public assistance in a typical year.

Even controlling for the effect of children and marriage as categorical eligibility in this manner, first birth status nevertheless still exerts

significant pressure on enrollment in public assistance. If the first child is less than a year old, the enrollment rate is .22, while if a premarital first birth occurs in the current year, the entry rate is raised to .30. If a first birth and a first marriage both occur in the current year, the predicted enrollment probability is slightly higher still (.32).

One major indirect impact of first birth on public assistance enrollment occurs via the impact of first birth in increasing work exits. Work exits in turn sharply increase entry to public assistance. Thus, a first birth which draws a woman out of work will also indirectly (as well as directly) increase her chances of enrolling in public assistance.

Public Assistance Exit, All Enrolled Women. The last major life change which we examine is exit from public assistance, and the impact of first birth status on exit probability. Of the sample (n = 1,102) of women on public assistance, 40 percent have left by the following year and exit rates are directly affected by first birth status.

A first child born in the previous year or in the years just preceding the previous year affects exit rates very little. However, a current year first birth affects exits sharply, in a way strongly determined by marital status. A postmarital first birth has no effect on exit chances. A first birth accompanied by a marriage increases exit probability substantially (to .58). In sharp contrast, a premarital first birth reduces exit chances to virtually zero.

Indirect impacts of first birth on exit are exerted via marital status, schooling status, and work status. Women who have the highest exit rates are those who become married or are already married; those who are already out of school and do not reenter; and those who are already working who continue to work. The greater the number of children, the lower the prob-

probability of an exit, providing another path via which a birth reduces exits from welfare recipiency.

Summary of Public Assistance Results. Premarital first births strongly propel women onto public assistance and reduce their chances of leaving. Postmarital first births exert only very slight pressures on entry and exit. The pressures of a first birth on entry and exit persist for a few years, but in very reduced magnitude. There are numerous indirect effects, generally acting to reinforce the direct effects.

SUMMARY AND CONCLUSIONS

Female Headed Families

The recent rise in the incidence of female headed families has concerned policy makers because nearly half of all families headed by a woman are in poverty. Although some of these families originate through the death of the husband, most are formed by divorce or separation or, to a lesser extent, by an out-of-wedlock birth. Since teenage births often precipitate early marriages, with their disproportionately high probability of break-up, or occur out-of-wedlock, the association between having a first birth as a teenager and later being a female head was explored among several samples of mothers. In the NLS, all women who had had a child by age 24 and all female heads with children at age 24 were studied. All PSID women with children under age 18 and all female heads with children less than 18 were also studied.

Teenage childbirth does not appear to be associated with subsequent female headship, either in cross tabulations or in multivariate analyses. However, the occurrence of a premarital birth does predict to later being a female head. A teenage marriage also predicts to later female headship, presumably because of the association between early marriage and marital break-up. Since pregnancy precipitates many early marriages and since teenage births occur disproportionately outside of marriage, early childbearing may be viewed as having an indirect effect.

Overall, women are less likely to be female heads if they have a young child, if they are white, attend church frequently, and, nonsignificantly, if they are Catholic. Women with relatively good earnings

and work experience are more likely to be female heads, although it is not clear whether they become female heads in part because they are advantaged in the labor market or whether being a female head has resulted in greater experience and earnings. Labor market conditions were not found to have any effect over and above women's own earnings. Women in cities and on the Pacific Coast are somewhat more likely to be female heads, as are women with a physical limitation of some sort and women without a high school education. Young women in the NLS sample are more likely to be female heads, though there is no effect of age in the PSID sample.

Welfare Recipiency

Of greater concern than the incidence of female headed families is the poverty and welfare dependency of this family form. We find a strong association between receipt of welfare assistance and age at first birth overall; however, our analyses indicate that this association disappears when controls for education, family size, labor force participation, age at marriage and race are included.

Mothers whose first child was born outside of marriage are more likely to receive welfare; this association is particularly strong among younger women. Women who have never married are considerably more likely to be welfare recipients. Age at marriage, however, is not related to the probability of public assistance.

A number of factors other than age at first childbirth were found to influence welfare dependency, and several of them suggest indirect routes by which the occurrence of an early birth increases the odds of welfare receipt at a later age. For example, women whose first birth occurs during the teenage years tend to have larger families, and family

size is a strong predictor of welfare recipiency. In addition, an early birth often disrupts the young women's schooling, and lower educational attainment increases the likelihood that a woman will later require public assistance. Women with relatively low earning ability and little work experience are also more likely to receive welfare, as are women who have some sort of physical limitation. Mothers who do not receive child support or alimony are considerably more likely to receive welfare, as are black women, and women who have been female heads for a relatively long time. In addition, women living in cities and on the Pacific Coast are slightly more likely to receive benefits. Finally, those women who live in states with relatively generous benefits in the Aid to Families with Dependent Children program have a little higher probability of being welfare recipients; but the association is not statistically significant among the sample of female heads.

In sum, early childbearing is not directly related to subsequent welfare dependency. However, a teenage birth can increase the probability of welfare receipt indirectly in numerous ways. To the extent that an early pregnancy precipitates teenage marriages which subsequently break up, the birth contributes to the formation of a family with a high probability of welfare dependency. Similarly, a teenage out-of-wedlock birth creates a family form with a high probability of needing public assistance. Moreover, the low educational attainment and relatively large families of teenage mothers increase the likelihood of welfare receipt. For these reasons, teenage mothers tend to be disproportionately represented among the recipients of public assistance.

Transition Probabilities

Another approach was employed to examine the short run association between a birth and welfare receipt. A strong association was found. Among NLS women who are not receiving public assistance, a premarital first birth greatly increases the probability that a woman will go on welfare. Among women who already live in households that receive assistance, a premarital first birth reduces the probability that a young woman will go off welfare to virtually zero. Postmarital first births exert only slight pressures on welfare entry and exit during the year of the birth. The impact of a first birth persists for several years, but in greatly reduced magnitude. Apparently, as the years go by, the direct impact of a birth translates into an indirect impact that is transmitted instead through variables such as education, income, and family size.

APPENDIX TABLES

Appendix Table 1 : Means and Standard Deviations for all Variables Used In Analysis of Female-Headed Households and Welfare Dependency Among Respondents Ever Having Children by Age 24 (National Longitudinal Survey)

Variable	Mean	Standard Deviation
Female-Headed Household	14 %	.347
Someone in Household Receiving Welfare	7	.262
Age at First Birth (in years)		
< 16	4 %	.201
16-17	15	.354
18	16	.364
19-20	31	.462
21-23	35	.476
Age at First Marriage (in years)		
10-15	3 %	.168
16-17	19	.391
18	21	.411
19-20	35	.478
21-23	19	.392
≥ 24	2.7	.162
First Birth Premarital	14 %	.351
Education (in years)	11.76 years	1.93
Parental Socioeconomic Status (PSES)	9.97	2.30
Intact Family	83	.372
AFDC Benefit Level (in region)	$235.75	66.10
Unemployment Rate	4.59%	2.46
Demand for Female Labor	31.35	4.74
Race	87	.338
South	34	.473
Pacific	15	.359
Age in 1968	22.04 years	1.48

Appendix Table 2: Variable Definitions, Means, and Standard Deviations for all Variables Used in Analysis of Welfare Dependency Among Three Samples of Women (Panel Study of Income Dynamics)

	All Women With Children Under 18		All Female Household Heads With Children Under 18		All Female Heads Under Age 35 With Children Under 18	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Welfare Receipt: Financial assistance from Aid to Families with Dependent Children or other welfare received by respondent's household in 1975; 1 = yes.	.160	.366	.472	.500	.470	.500
Age at First Child Birth of Respondent (in years)						
≤15	.039	.192	.040	.197	.043	.204
16-17	.136	.343	.155	.362	.233	.424
18	.103	.304	.127	.333	.181	.386
19-20	.247	.432	.256	.437	.272	.446
21-23	.255	.436	.256	.437	.194	.396
≥24	.214	.410	.223	.417	.078	.268
Age at First Marriage of Respondent (in years)						
15	.058	.233	.055	.229	.041	.199
16-17	.185	.389	.206	.405	.164	.371
18	.146	.353	.106	.308	.094	.292
19-20	.259	.438	.173	.379	.158	.366
21-23	.207	.405	.151	.358	.070	.256
24	.095	.293	.091	.287	.035	.185
Never married	.051	.219	.219	.414	.439	.498
Education of woman in 1976						
<12 years	.344	.475	.468	.500	.411	.493
=12 years	.456	.498	.385	.487	.450	.499
>12 years	.200	.400	.148	.355	.139	.346
Number of Children Under Age 18 in 1976	3.385	2.100	3.322	1.932	2.410	1.310
Proportion of Years Since Age 18 That the Woman Has Worked	.527	.335	.609	.330	.631	.331
Monthly Earnings: actual if woman is employed; estimated potential earnings if not employed	339.234	282.933	378.661	297.994	370.516	272.399
Race of Respondent (1 = White)	.586	.493	.296	.457	.285	.452
Parental Socioeconomic Status: Index based on education of mother and father and occupation of head of household when respondent was age 14; standardized to have a mean of 10 and a standard deviation of 3.	9.887	2.319	9.391	2.202	9.874	2.210
Age of Respondent in 1976 in years	35.659	7.622	35.573	7.777	28.405	3.188
Pacific Residence: Respondent lived in a Pacific Coast state in 1976	.106	.308	.123	.329	.103	.305
Metropolitan Area Residence: Respondent lived in an SMSA in 1976	.720	.449	.849	.358	.832	.375
Timing of First Birth Relative to First Marriage: Birth Occurred Before Year of First Marriage = Premarital; 1 = Premarital.	.169	.375	.369	.483	.578	.495
Whether Any of the Respondent's Income Included Alimony or Child Support in 1976; 1 = Yes	.076	.265	.223	.423	.246	.431
Child Under 6: Whether Respondent Has a Child Under the Age of 6 Present in the Household in 1976	.363	.481	.286	.452	.517	.501
Physical Limitation: Whether Respondent Has a Physical Problem Limiting Her Activity; 1 = Yes	.120	.325	.184	.387	.095	.294

Appendix Table 2 (Continued)

	All Women With Children Under 18		All Female Household Heads With Children Under 18		All Female Heads Under Age 35 With Children Under 18	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Years Respondent Spent as a Female Household Head During the Course of the PSID Survey: Ranges From Zero to All the Years Between 1968 and 1972						
≤1 Years	.653	.476	.054	.227	.078	.268
2-3 Years	.095	.293	.155	.362	.228	.421
4-5 Years	.081	.272	.209	.407	.280	.450
6-7 Years	.056	.230	.167	.373	.220	.415
≥8 Years	.116	.320	.415	.493	.194	.396
AFDC Benefit Level: Maximum Monthly AFDC Benefit for a Family of 4 in the Respondent's State of Residence in 1975	277.614	109.093	274.442	109.335	268.598	113.576
Unemployment Rate in Respondent's County of Residence: 1 = <2%; 2 = 2-3.9%; 3 = 4-5.9%; 4 = 6-8.9%; 5 = 9-10%; 6 = 10.1-12%; 7 = >12%	4.125	1.301	4.329	1.256	4.377	1.303
Market for Females vs. Males: Demand for Female Compared With Male Labor in Local Labor Market (1 = Worse)	.379	.485	.401	.491	.434	.497
Male Wage: Typical Wage that an Unskilled Male Worker Might Receive; August 1976: 1 = <$1.50; 2 = $1.50-$1.99; 3 = $2.00-$2.49; 4 = $2.50-$2.99; 5 = ≥$3.00	2.737	.476	2.729	.465	2.726	.459

Appendix Table 3: WELFARE ENTRY PROBABILITY, ALL WOMEN 1968-72

(National Longitudinal Survey)

Eligible: Women who did not receive public assistance in year prior to t
Dependent Variable: = 1 if received public assistance in year prior to t+1; mean = .041

Independent Variables	Mean of Independent Variable	B	Beta
I. FIRST BIRTH			
(1) Prior First Birth	30%	.03***	.06***
(2) Prior First Birth One Year Ago	5.5%	.02**	.03**
II. SELECTED CHARACTERISTICS			
(1) Intact Family of Origin	89%	-.03***	-.05***
(2) Parental Socioeconomic Status	10.71	-.01***	-.06***
(3) Age 14-15	8%	a	a
16-17	19%	.03***	.06***
18	11%	.12***	.19***
19-20	19%	.07***	.14***
21-23	26%	.06***	.13***
24-28	18%	.04**	.08**
(4) Birth Cohort 1952-54	34%	-.02	-.04
1948-51	37%	-.04***	-.10***
1944-47	29%	a	a
(5) White	91%	-.06***	-.08***
(6) Year 1968	26%	-.17***	-.38***
1969	26%	-.13***	-.23***
1970	25%	-.07***	-.15***
1971	22%	a	a
(7) Enrolled Full Time	37%	.05***	.13***
(8) Change in AFDC Benefit Level	-51%	.0003***	.03***
(9) Occupational Status (Duncan Score)	36	-.0008***	-.086***
(10) Unemployed	3.03%	.03***	.03***
(11) Wage at T	$1.20	.007***	.05***
(12) Worked Zero Weeks	31%	.07***	.16***
(13) South	25%	-.03***	-.06***
(14) Unemployment Rate	4.56%	-.005***	-.05***
(15) Grades Completed ≤8	6%	.04***	.05***
9-11	33%	a	a
12	41%	a	a
(16) Years Off Welfare	2.40	-.04***	-.24***
III. MAJOR CURRENT YEAR EVENTS			
(1) First Birth, Timing:			
(1.1) Premarital	.51%	.20***	.07***
(1.2) Uncertain	.98%	.03	.02
(1.3) Postmarital	4.3%	.02*	.02*
(2) Birth, First or Later	12%	.002	.003
(3) Marriage	9%	.11***	.17***
(4) Divorce	2.8%	.10***	.08***
(5) Remain Unmarried	53%	.03***	.07***
(6) Geographic move	8%	.10***	.14***
(7) Reenter School	1.9%	.03*	.02*
(8) Drop Out of School	9.7%	-.05***	-.08***
(9) Enter Labor Force	12%	-.04***	-.07***
(10) Leave Labor Force	11%	.03***	.05***

R^2 = .16 F = 33.21 N = 16000

*p ≤.05
**p ≤.01
***p ≤.001
a = dummy variable, omitted category

Appendix Table 4: Welfare Entry, Unmarried Women With Dependent Children 1968-72 (National Longitudinal Survey)

Eligible: Women who did not receive public assistance in year prior to t, were not married, spouse present, in t+1, and who had one or more children under 18 years of age in t+1

Dependent Variable = 1 if received public assistance in year prior to t+1

Independent Variables	Mean of Independent Variables	B	Beta
I. FIRST BIRTH			
(1) Prior First Birth	61%	.02	.03
(2) Prior First Birth One Year Ago	8.8%	.09***	.07***
II. SELECTED CHARACTERISTICS			
(1) Age: 16-17	12%	.06	.06
18	9%	.16***	.14***
19-20	13%	.11**	.13**
21-23	38%	.09	.13
24-28	19%	.07	.08
(2) Race	75%	-.09***	-.11***
(3) Year 1968	27%	-.41***	-.53***
1969	26%	-.33***	-.42***
1970	34%	-.24***	-.33***
1971	13%	a	a
(4) Grades Completed = 8	7.3%	.15***	.12***
(5) Change in Unemployment Rate	45%	.013***	.08***
(6) Change in AFDC Benefit Level	3.64	.001	.03
(7) Worked 0 Weeks	32%	.02	.03
(8) AFDC Benefit Level	$237.	.000***	.10***
(9) Number of Children Under 18	81%	.08***	.21***
(10) Years Off Welfare	2.18	-.09***	-.30***
III CURRENT MAJOR LIFE CHANGES			
(1) First Birth, Timing:			
(1.1) Premarital	6.7%	.19***	.14***
(1.2) Uncertain	1.5%	.21**	.07**
(1.3) Postmarital	2.7%	.07	.03
(2) Leave Labor Force	3%	.25***	.19***
Constant Term		.31	

R^2 = .24 F = 19.67 N = 1400

Appendix Table 5: Welfare Exit Probability, 1968-72

(National Longitudinal Survey)

Eligible: Women who received public assistance in year prior to t
Dependent Variables = 1 if did not receive public assistance in year prior to t+1

Independent Variables	Mean of Independent Variable	B	Beta
I. FIRST BIRTH			
(1) Birst Birth Prior to t	54%	-.12*	-.13*
(2) First Birth in Previous Year		.021	.012
(3) First Birth Prior to t:			
(3.1) Uncertain	14%	.11*	.076*
II. SELECTED CHARACTERISTICS			
(1) Change in Unemployment Rate	47%	.017	.033
(2) Occupational Status	26	.0031***	.11***
(3) Worked 0 Weeks	45%	-.12***	-.13***
(4) Demand for Female Labor	30		
(5) Number of Children Under 18	1.08	-.055***	-.16***
(6) Years on Welfare	.65	-.07***	-.13***
III CURRENT MAJOR LIFE CHANGES			
(1) First Birth in Current Year			
(1.1) Premarital		-.21	-.068
(1.2) Uncertain		.11	.025
(1.3) Postmarital		.026	.0049
(2) Birth, Second or Later		-.065	-.047
(3) Marriage		.049	.029
(4) Remain Unmarried		-.28***	-.26***
(5) School Reentry		-.13	-.066
(6) School Drop Out		-.10	-.061
(7) Does Not Drop Out		-.065	-.043

*p <.05
**p <.01
***p <.001
a = dummy variable, omitted category

Appendix Table 6: The Probability of Going on Welfare in Any Given Year By the Timing of a First Birth, Age of the Respondent, and Marital Status, Adjusted For Selected Social and Demographic Factors (Panel Study of Income Dynamics)

	All Women						Unmarried Women	
	Age 15-17		Age 18-20		Age 21-23		Age 21-23	
	Proportion In Category	Predicted Probability Mean = .007	Proportion In Category	Predicted Probability Mean = .017	Proportion In Category	Predicted Probability Mean = .013	Proportion In Category	Predicted Probability Mean = .019
First Birth:								
None Yet	.83	.003	.58	.006	.43	.015	.70	.023
In Current Year	.07	.016	.09	.024	.06	.002	.09	.013
One Year Ago	.10	.033*	.11	.021	.09	.005	.05	.005
Two Years Ago			.09	.033	.09	.009	.05	.060
Over Two Years Ago			.13	.045**	.33	.003	.11	.010
Marital Status:								
Married at Start of Year	.04	.000	.45	.022	.72	.014	-	-
Not Married	.96	.008	.55	.013	.28	.009	-	-
Work Status:								
Worked > 30 Hours Last Year	.33	.004	.67	.018	.77	.0)	.80	.002
Worked < 30 Hours Last Year	.67	.009	.33	.014	.23	.022	.20	.085
School Status:								
In School at Start of Year	.93	.008	.37	.006*	.16	.008	.24	.000
Not in School	.07	.000	.63	.023	.84	.014	.76	.031
Race:								
White	.93	.001***	.90	.013**	.89	.009***	.88	.016
Nonwhite	.07	.091	.10	.053	.11	.043	.12	.042
Constant		.043		.058		.064		.207
F_2		4.1		5.0		2.2		2.7
R^2		.130		.063		.022		.109
N		371.		1,134.		1,446.		322.

* = p < .05
** = p < .01
*** = p < .001

- = omitted from analysis

Appendix Table 7: Welfare Entry Probability: Regression Coefficients For Women 15-17, 18-20, and 21-23 Years Old (Panel Study of Income Dynamics)

	Age 15-17		Age 18-20		Age 21-23	
Independent Variables	b	Sample Mean $\bar{Y} = .007$	b	Sample Mean $\bar{Y} = .017$	b	Sample Mean $\bar{Y} = .013$
First Birth Timing:						
No First Birth Yet	a	.81	a	.58	a	.43
First Birth in Current Year	.013	.07	.018	.09	- .013	.06
First Birth in Previous Year	.030 *	.10	.015	.11	- .010	.09
First Birth Two Years Ago			.027*	.09	.004	.09
First Birth Over Two Years Ago			.039***	.13	- .002	.33
Marital Status:						
Married at Start of Year	- .022	.04	.009	.45	.005	.72
Not Married	a	.96	a	.55	a	.28
Work Status:						
Worked > 30 Hours in Previous Year	- .005	.33	.004	.67	- .012	.77
Worked < 30 Hours in Previous Year	a	.67	a	.33	a	.23
School Status:						
In School at Start of Year	.014	.93	- .019*	.37	- .006	.16
Not in School	a	.07	a	.63	a	.84
White	- .090 ***	.93	- .040**	.90	- .034 ***	.89
Decile Income/Needs if Head or Wife	- .0002	.02	- .008***	1.67	- .0031**	3.90
Decile Income/Needs if Not Head or Wife	- .002	3.98	- .004**	2.16	- .0032*	.69
AFDC Benefit Level	7.2×10^{-5}*	$328.	3.3×10^{-5}	$317.	2.6×10^{-5}	$311.
Unemployment Rate	.002	3.09	.005	3.17	- .001	3.25
Female vs. Male Unskilled Labor Market	.004	2.43	- .006	2.39	- .002	2.30
Year:						
1968	-	.00	a	.00	a	.00
1969	-	.00	a	.00	a	.00
1970	.001	.48	.038***	.26	.010	.11
1971	.017 *	.33				
1972	a	.19	.008	.44	.004	.41
1973	-	.00				
1974	-	.00	-	.33	-	.48
1975	-	.00	-		-	
Constant	.043		.058		.064	
F_2	4.1 ***		5.0 ***		2.2 **	
R^2	.130		.063		.022	
N	371.		1,134.		1,446.	

* = p < .05
** = p < .01
*** = p < .001

a = omitted category
- = omitted from regression

Appendix Table 8 : Welfare Entry Probability: Regression Coefficients for Women 21-23 Years Old And Not Married, Spouse Present at the Start of the Year (Panel Study of Income Dynamics)

Independent Variables	b	Sample Mean $\bar{Y}$ = .019
First Birth Timing:		
No First Birth Yet	a	a
First Birth in Current Year	- .036	.089
First Birth in Previous Year	- .018	.050
First Birth Two Years Ago	.037	.046
First Birth Over Two Years Ago	- .013	.110
Work Status:		
Worked > 30 Hours in Previous Year	- .083 ***	.804
Worked < 30 Hours in Previous Year	a	a
School Status:		
In School at Start of Year	- .051 *	.235
Not in School	a	a
White	- .026	.880
Decile Income/Needs if Head or Wife	- .005	1.513
Decile Income/Needs if Not Head or Wife	- .005	2.351
AFDC Benefit Level	- .0001	$319.
Unemployment Rate	.0004	3.091
Female vs. Male Unskilled Labor Market	- .023 *	2.386
Year:		
1968-1969	a	a
1970-1971	.026	.342
1972-1973	.040	.420
1974-1975	a	.238
Constant	.207	
F_2	2.691	
R^2	.1093	
N	322.	

* = p <.05
** = p <.01
*** = p <.001

a = omitted category

METHODOLOGICAL APPENDIX

Estimating Flow Models: Transition Probabilities

The transition probability approach relies on multivariate models which partition the variance in binary dependent variables. In every case the dependent variable is assigned a one if the woman reports moving to a new status at year t+1, compared to her status at year t. A zero is assigned if the woman remains in the same status at year t+1 as she was in at year t. For example, the schooling exit dependent variable is one if a woman moves out of full-time school enrollment by t+1, given that she was fully enrolled at t. The exit variable is set equal to zero if she remains fully enrolled at t+1. Similarly, if a married woman divorces, the dependent variable is set to one. If she remains with her husband at t+1, the dependent variable is set to zero.

The definition of eligible observations is critical. For example, a woman is eligible for inclusion in the schooling exit sample if she reports being enrolled full-time in school at the start of any year. A woman is eligible for the school re-entry sample if she reports being not enrolled full-time in school at the start of any year. The observational unit is a person-year, which always includes status information both at the start and the end of the year for a particular woman. Given information on status at two points in time, it is possible to define status change variables, such as the dependent variable (e.g., school exit or reentry), but also any number of independent variables.

Both level and change variables are included as predictors. However, for binary status variables (e.g., enrolled full-time in school vs. not enrolled full-time in school) care must be excerised to avoid redundancy. To represent level alone, two dummy variables are defined but only one of them

is included in the equation:

A. Two level measures: (use only one)

(1) Enrolled full-time in school in year t

(2) Not enrolled full-time in school in year t

If change variables are preferred, four dummy variables are defined and three are used:

B. Four change measures: (use only three)

(1) Exit from school between year t and year t+1

(2) Remain in school

(3) Reenter school

(4) Remain out of school

Note, however, that to use three change variables implicitly specifies level, so that both level and change are completely described (e.g., if one either exits from school or remains in school, then one necessarily was in school at t). Including one level together with three change measures is therefore redundant and would cause matrix inversion problems. Care was taken to avoid doing so.

The transition probabilities strategy has taken advantage of the panel data to pool observations. For example, there are five waves of the NLS panel, each woman has four defined person-years: 1968 to 1969, 1969 to 1970, 1970 to 1971, and 1971 to 1972. It is possible for all four of these person-years to be included as observations in a single equation. For example, if a woman is single in 1968, 1969, 1970, and 1971, all four of her person-years would be eligible for inclusion in the first marriage equation.

In ordinary least squares estimation, autocorrelated disturbances do not bias parameter estimates, but they do bias estimates of the standard errors of parameter estimates. Typically the standard errors are biased downwards. One

gets the impression that one's parameter estimates are more efficiently estimated than is truly the case. The heart of the problem is that if a single woman contributes up to four person-year observations, there is something less than four full degrees of freedom in those four observations. Autocorrelation thus typically leads to improper inclusion of variables in an equation based on upwardly biased t-statistics.

Note, however, that parameter estimates with pooling are still unbiased. Moreover, the degree of pooling in these equations is relatively small, since typically fewer than four person-year observations from a single woman are pooled.[1] Where pooling is negligible or absent, our results appear comparable to results with the most pooling. Pooling is most frequent in analyses of the first marriage, marital split, high school drop-out and public assistance entry. In these cases care has been used to be conservative in the use of significance tests.

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1. In the education equations, reentry is estimated with no pooling, and the high school and college graduate exit equations should have virtually no pooling. Where transition rates are high (e.g., over 20 percent), pooling is minimized, as in the re-marriage, first birth (married women), college drop-out, work entry, work exit and public assistance exit equations. The hours and wage equations also minimize pooling.

Dichotomous Dependent Variables

The ideal model form for a binary dependent variable is the logit or a related model. The linear model creates heteroscedartic disturbances and the more basic problem of a misspecified model, especially at the extremes. A maximum-likelihood logit model solves these problems, but it creates other problems:

(1) cost: especially (a) with large data files such as the ones we are using, and (b) with a large number of independent variables and (c) with the likelihood of one or two reestimates of the equation, the very substantial estimation costs must be weighed against the benefits of improved information.

(2) complexity: results of ordinary least squares are easier to understand and communicate by an order of magnitude than maximum likelihood logit estimates. Until the use of maximum likelihood logit grows more familiar, this must be weighted as a cost, especially in policy research.

Goodman has argued convincingly (1976) that ordinary least squares provide virtually identical information as maximum likelihood logit, especially

(1) where n is large and

(2) where the mean of the dependent variable is not too close to the bounds. In all cases, we use an n that is large by Goodman's standards and in most cases the means of our dependent variables are far enough from the bounds by his standards (i.e., between .20 and .80). Caution is warranted for the few equations in which the mean was close to zero (e.g., school re-entry, public assistance entry, and first birth to unmarried women).

S. Caldwell

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